



March 28, 2005

Mr. James C. Harris, P.E.
US EPA, Region 8
Montana Office
10 W. 15th Street
Helena, MT 59626

Re: **Johnston Acres – EPH and SVOC Soil Sample Results**
Libby, MT

Dear Mr. Harris:

On behalf of International Paper Co. (IP), Arrowhead Engineering, Inc. (AEI) is submitting the attached analytical results (Attachment 1) from the Johnston Acres area of Libby, MT. These soil-boring samples were voluntarily analyzed by International Paper to assist in identifying the “conspicuous substance” identified by CDM in the Johnston Acres area. The primary purpose for analyzing the samples was to determine whether or not the oily substance was possibly related to the treatment fluid historically used at the former St. Regis wood treatment plant that is the focus of the Libby Ground Water Site in Libby, MT.

Based on the analytical results attached, the oily material (“conspicuous substance”) in the soil boring samples is not related to the treating fluid historically used at the former wood treatment plant. The treating fluid from the former wood treatment plant is a mixture of fuel oil (carrier fluid), creosote and pentachlorophenol (PCP). The quantity of creosote typically found in the treating fluid ranges as high as 30 percent. The PCP concentration in the treating fluid ranges between 1 and 3 percent. The analytical results indicate that the substance does not contain creosote or PCP, and is not consistent with fuel oil or diesel.

In an effort to identify the oily substance, an analytical chemist (Bill Brown of Energy Laboratories, Inc. (ELI)) was contacted to discuss the results. The opinion of Bill Brown further supports the conclusion that the substance is not a wood treating fluid containing creosote and/or PCP. According to Mr. Brown, the results indicate the substance is likely a “heavy” petroleum compound such as road oil or asphalt. Given the physical state of the substance (liquid), the material is likely road oil and not asphalt.

Arrowhead Engineering, Inc.

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Background

In advance of excavating for the installation of underground utilities (e.g. sanitary sewer, storm sewer, etc.) in the Johnston Acres area, a number of soil borings were completed beneath existing streets to investigate for Libby Vermiculite Mine products. This investigation was conducted by CDM personnel under contract to the EPA.

According to a letter from CDM received by AEI via facsimile on February 14, 2005, a "conspicuous substance" was encountered in several of the soil borings. Based on CDM's description, the substance was "a thick, brown to black liquid with a strong odor".

In a telephone conversation during the week of February 14, 2005 between EPA, IP and AEI, Tom Ross of IP volunteered to split two samples with EPA for the analysis of EPH fractionation and semi-volatile organic compounds (SVOCs). AEI personnel split two samples (Boring #CS-20027 and CS-20036) with CDM on February 21, 2005. These samples were submitted by AEI to ELI in Billings, MT for analysis by MA EPH Fractionation and SVOCs via method SW8270C. Similarly, CDM submitted their samples to Alpha Analytical Laboratories of Westborough, Massachusetts for analysis of EPH, SVOCs, and TPH DRO. A copy CDM's results are also attached to this letter (Attachment 2).

Since these samples were submitted outside the applicable holding times, these results should be viewed qualitatively instead of quantitatively.

Results and Discussion:

SVOCs – The primary purpose of the SVOCs analysis (SW8270C) was to determine whether or not the "conspicuous substance" contained creosote or pentachlorophenol. The attached results show that very few polynuclear aromatic hydrocarbons (PAHs) were detected by either analytical laboratories. The results also show that pentachlorophenol (PCP) was not detected by either laboratory in the two soil samples. Therefore, this oily material does not contain creosote or PCP. Creosote is composed primarily of PAHs which, if present, would have been detected at high concentrations in the SVOC analysis.

EPH Fractionation – The primary purpose of the EPH analysis was to determine the types of hydrocarbons present in the oily material. The EPH results summarized in Table 1 show that the oily substance contained heavier fractions of hydrocarbons. The lack of significant concentrations of light hydrocarbon chains (C9 to C18 Aliphatics) indicates the material is not likely fuel oil or diesel. Instead the oily material is more likely road oil or asphalt.

Arrowhead Engineering, Inc.

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Table 1
EPH Fractionation Results

Sample No.	C9 – C18 Aliphatics		C19 – C36 Aliphatics		C11 – C22 Aromatics	
	AAL	ELI	AAL	ELI	AAL	ELI
CS-20027	94.5 mg/kg	<100 mg/kg	512 mg/kg	142 mg/kg	848 mg/kg	140 mg/kg
CS-20036	94.5 mg/kg	<100 mg/kg	65.2 mg/kg	131 mg/kg	583 mg/kg	181 mg/kg

AAL – Alpha Analytical Laboratories

ELI – Energy Laboratories, Inc.

If you would like to discuss these results in more detail, please call me at 406.293.9387.

Sincerely,



David Cosgriff, P.E.

Arrowhead Engineering, Inc.

Attachment 1 – Energy Laboratory Inc. – Data Package B05021091

Attachment 2 – Alpha Analytical Laboratories – Data Package L0501766

C (w/attach.) Dan Thede, City of Libby
Jim Christiansen, EPA-Libby
Tom Ross, IP-Memphis, TN

Attachment 1

Energy Laboratory Inc. – Data Package B05021091



ENERGY LABORATORIES, INC. • P.O. Box 30910 • 1120 South 27th Street • Billings, MT 59107-0916
800-735-4489 • 406-252-6325 • 406-252-6069 fax • el@energylab.com

ANALYTICAL SUMMARY REPORT

March 11, 2005

Arrowhead Engineering
1504 Kaniksu Avenue
PO Box 843
Libby, MT 59923

Workorder No.: B05021091

Project Name: Johnston Acres Investigation-Soil Borings

Energy Laboratories Inc received the following 2 samples from Arrowhead Engineering on 2/22/2005 for analysis.

Sample ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
B05021091-001	CS-20027	01/24/05 0:00	02/22/05	Soil	EPH-Ultrasonic Extraction EPH Fractionation Hydrocarbons, Extractable Petroleum Hydrocarbons, Extractable Petroleum Moisture Moisture Soil Sonication Extraction Semi-Volatile Organic Compounds
B05021091-002	CS-20036	01/24/05 0:00	02/22/05	Soil	Same As Above

There were no problems with the analyses and all data for associated QC met EPA or laboratory specifications except if noted in report comments or the Case Narrative.

If you have any questions regarding these tests results, please call.

Report Approved By: John A. Valla



ENERGY LABORATORIES, INC. • P.O. Box 30916 • 1120 South 27th Street • Billings, MT 59107-0916
800-735-4489 • 406-252-6925 • 406-252-6069 fax • eff@energylab.com

Date: 11-Mar-05

CLIENT: Arrowhead Engineering
Project: Johnston Acres Investigation-Soil Borings
Sample Delivery Group: B05021091

CASE NARRATIVE

Samples for 8270C and EPH analyses were extracted beyond method recommended holding times. Method recommended holding time for extraction from date of sampling is 7 days for EPH and 14 days for 8270C.



LABORATORY ANALYTICAL REPORT

Client: Arrowhead Engineering
Project: Johnston Acres Investigation-Soil Borings
Lab ID: B05021091-001
Client Sample ID: CS-20027

Report Date: 03/11/05
Collection Date: 01/24/05
Date Received: 02/22/05
Matrix: Soil

Analyses	Result	Units	QnL	MCL/		Method	Analysis Date / By
				RL	QCL		
PHYSICAL CHARACTERISTICS							
Moisture	4.3	wt%		0.01		SW3650A	02/25/05 11:08 / elf
EXTRACTABLE PETROLEUM HYDROCARBONS							
C9 to C18 Aliphatics	ND	mg/kg		20	100	MA-EPH	03/10/05 08:04 / pbf
C19 to C36 Aliphatics	142	mg/kg		20	2500	MA-EPH	03/10/05 08:04 / pbf
Sur: 1-Chloro-octadecane	22.9	%REC	S		40-140	MA-EPH	03/10/05 08:04 / pbf
C11 to C22 Aromatics	140	mg/kg	*	20	70	MA-EPH	03/10/05 08:52 / pbf
Total Extractable Hydrocarbons	435	mg/kg		20		MA-EPH	03/10/05 08:52 / pbf
Sur: 2-Bromonaphthalene	75.4	%REC			40-140	MA-EPH	03/10/05 08:52 / pbf
Sur: 2-Fluorobiphenyl	71.9	%REC			40-140	MA-EPH	03/10/05 08:52 / pbf
Sur: o-Terphenyl	21.1	%REC	S		40-140	MA-EPH	03/10/05 08:52 / pbf
- Note: Total Extractable Hydrocarbons are defined as the total hydrocarbon response regardless of elution time.							
- *The reported value exceeds the Maximum Contaminant Limit (MCL). The MCLs listed for target analyte and hydrocarbon range values are the most conservative Montana DEQ RBSEs. These limits may not apply to your samples.							
S=Surrogate recovery below method detection limit due to sample matrix interferences. Quantitative transfer of extract was not possible during extract dilution step. A low bias to final analytical results is expected.							
SEMI-VOLATILE ORGANIC COMPOUNDS							
1,2,4-Trichlorobenzene	ND	mg/kg		3.3		SW8270C	03/02/05 20:29 / dsm
1,2-Dichlorobenzene	ND	mg/kg		3.3		SW8270C	03/02/05 20:29 / dsm
1,3-Dichlorobenzene	ND	mg/kg		3.3		SW8270C	03/02/05 20:29 / dsm
1,4-Dichlorobenzene	ND	mg/kg		3.3		SW8270C	03/02/05 20:29 / dsm
1-Methylnaphthalene	ND	mg/kg		3.3		SW8270C	03/02/05 20:29 / dsm
2,4,5-Trichlorophenol	ND	mg/kg		3.3		SW8270C	03/02/05 20:29 / dsm
2,4,6-Trichlorophenol	ND	mg/kg		3.3		SW8270C	03/02/05 20:29 / dsm
2,4-Dichlorophenol	ND	mg/kg		3.3		SW8270C	03/02/05 20:29 / dsm
2,4-Dimethylphenol	ND	mg/kg		3.3		SW8270C	03/02/05 20:29 / dsm
2,4-Dinitrophenol	ND	mg/kg		17		SW8270C	03/02/05 20:29 / dsm
2,4-Dinitrotoluene	ND	mg/kg		3.3		SW8270C	03/02/05 20:29 / dsm
2,6-Dinitrotoluene	ND	mg/kg		3.3		SW8270C	03/02/05 20:29 / dsm
2-Choronaphthalene	ND	mg/kg		3.3		SW8270C	03/02/05 20:29 / dsm
2-Chlorophenol	ND	mg/kg		3.3		SW8270C	03/02/05 20:29 / dsm
2-Methylnaphthalene	ND	mg/kg		3.3		SW8270C	03/02/05 20:29 / dsm
2-Nitrophenol	ND	mg/kg		3.3		SW8270C	03/02/05 20:29 / dsm
3,3'-Dichlorobenzidine	ND	mg/kg		6.7		SW8270C	03/02/05 20:29 / dsm
4,6-Dinitro-2-methylphenol	ND	mg/kg		17		SW8270C	03/02/05 20:29 / dsm
4-Bromophenyl phenyl ether	ND	mg/kg		3.3		SW8270C	03/02/05 20:29 / dsm
4-Chloro-3-methylphenol	ND	mg/kg		3.3		SW8270C	03/02/05 20:29 / dsm
4-Chlorophenol	ND	mg/kg		3.3		SW8270C	03/02/05 20:29 / dsm
4-Chlorophenyl phenyl ether	ND	mg/kg		3.3		SW8270C	03/02/05 20:29 / dsm
4-Nitrophenol	ND	mg/kg		17		SW8270C	03/02/05 20:29 / dsm

Report RL - Analyte reporting limit.
Definitions: QCL - Quality control limit.
* - The result exceeds the MCL.

MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
S - Spike recovery outside of advisory limits.



LABORATORY ANALYTICAL REPORT

Client: Arrowhead Engineering
Project: Johnston Acres Investigation-Soil Borings
Lab ID: B05021091-001
Client Sample ID: CS-20027

Report Date: 03/11/05
Collection Date: 01/24/05
Date Received: 02/22/05
Matrix: Soil

Analyses	Result	Units	Qual	MCL/ RL QCL		Method	Analysis Date / By
				RL	QCL		
SEMI-VOLATILE ORGANIC COMPOUNDS							
Aceanaphthalene	ND	mg/kg		3.3		SW8270C	03/02/05 20:29 / dsm
Acenaphthylene	ND	mg/kg		3.3		SW8270C	03/02/05 20:29 / dsm
Anthracene	ND	mg/kg		3.3		SW8270C	03/02/05 20:29 / dsm
Azobenzene	ND	mg/kg		3.3		SW8270C	03/02/05 20:29 / dsm
Benzidine	ND	mg/kg		5.7		SW8270C	03/02/05 20:29 / dsm
Benzo(a)anthracene	ND	mg/kg		3.3		SW8270C	03/02/05 20:29 / dsm
Benzo(a)pyrene	ND	mg/kg		3.3		SW8270C	03/02/05 20:29 / dsm
Benzo(b)fluoranthene	ND	mg/kg		3.3		SW8270C	03/02/05 20:29 / dsm
Benzo(g,h,i)perylene	ND	mg/kg		3.3		SW8270C	03/02/05 20:29 / dsm
Benzo(k)fluoranthene	ND	mg/kg		3.3		SW8270C	03/02/05 20:29 / dsm
bis(2-chloroethoxy)Methane	ND	mg/kg		3.3		SW8270C	03/02/05 20:29 / dsm
bis(2-chloroethyl)Ether	ND	mg/kg		3.3		SW8270C	03/02/05 20:29 / dsm
bis(2-chloroisopropyl)Ether	ND	mg/kg		3.3		SW8270C	03/02/05 20:29 / dsm
bis(2-ethylhexyl)Phthalate	ND	mg/kg		3.3		SW8270C	03/02/05 20:29 / dsm
Butylbenzylphthalate	ND	mg/kg		3.3		SW8270C	03/02/05 20:29 / dsm
Chrysene	0.38	mg/kg	J	3.3		SW8270C	03/02/05 20:29 / dsm
Dibenz(a,h)anthracene	ND	mg/kg		3.3		SW8270C	03/02/05 20:29 / dsm
Diethyl phthalate	ND	mg/kg		3.3		SW8270C	03/02/05 20:29 / dsm
Dimethyl phthalate	ND	mg/kg		3.3		SW8270C	03/02/05 20:29 / dsm
Di-n-butyl phthalate	ND	mg/kg		3.3		SW8270C	03/02/05 20:29 / dsm
Di-n-octyl phthalate	ND	mg/kg		3.3		SW8270C	03/02/05 20:29 / dsm
Fluoranthene	ND	mg/kg		3.3		SW8270C	03/02/05 20:29 / dsm
Fluorene	ND	mg/kg		3.3		SW8270C	03/02/05 20:29 / dsm
Hexachlorobenzene	ND	mg/kg		3.3		SW8270C	03/02/05 20:29 / dsm
Hexachlorobutadiene	ND	mg/kg		3.3		SW8270C	03/02/05 20:29 / dsm
Hexachlorocyclopentadiene	ND	mg/kg		6.7		SW8270C	03/02/05 20:29 / dsm
Hexachloroethane	ND	mg/kg		3.3		SW8270C	03/02/05 20:29 / dsm
Indeno(1,2,3- <i>cd</i>)pyrene	ND	mg/kg		3.3		SW8270C	03/02/05 20:29 / dsm
Isophorone	ND	mg/kg		3.3		SW8270C	03/02/05 20:29 / dsm
m+p-Cresols	ND	mg/kg		3.3		SW8270C	03/02/05 20:29 / dsm
Naphthalene	ND	mg/kg		3.3		SW8270C	03/02/05 20:29 / dsm
Nitrobenzene	ND	mg/kg		3.3		SW8270C	03/02/05 20:29 / dsm
n-Nitrosodimethylamine	ND	mg/kg		3.3		SW8270C	03/02/05 20:29 / dsm
n-Nitroso-di-n-propylamine	ND	mg/kg		3.3		SW8270C	03/02/05 20:29 / dsm
n-Nitrosodiphenylamine	ND	mg/kg		3.3		SW8270C	03/02/05 20:29 / dsm
o-Cresol	ND	mg/kg		3.3		SW8270C	03/02/05 20:29 / dsm
Pentachlorophenol	ND	mg/kg		17		SW8270C	03/02/05 20:29 / dsm
Phenanthrene	ND	mg/kg		3.3		SW8270C	03/02/05 20:29 / dsm
Phenol	ND	mg/kg		3.3		SW8270C	03/02/05 20:29 / dsm
Pyrene	0.53	mg/kg	J	3.3		SW8270C	03/02/05 20:29 / dsm
Pyridine	ND	mg/kg		6.7		SW8270C	03/02/05 20:29 / dsm

Report RL - Analyte reporting limit.

Definitions: QCL - Quality control limit.

MCL - Maximum contaminant level.

ND - Not detected at the reporting limit.

J - Estimated value. The analyte was present but less than the reporting limit.



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LABORATORY ANALYTICAL REPORT

Client: Arrowhead Engineering
Project: Johnston Acres Investigation-Soil Borings
Lab ID: B05021091-001
Client Sample ID: CS-20027

Report Date: 03/11/05
Collection Date: 01/24/05
Date Received: 02/22/05
Matrix: Soil

Analyses	Result	Units	Qual	MCL/		Method	Analysis Date / By
				RL	QCL		
SEMI-VOLATILE ORGANIC COMPOUNDS							
Surr: 2,4,6-Tribromophenol	94.5	%REC		19-122	SW8270C	03/02/05 20:29 / dsm	
Surr: 2-Fluorobiphenyl	87.2	%REC	J	30-115	SW8270C	03/02/05 20:29 / dsm	
Surr: 2-Fluorophenol	92.0	%REC		25-121	SW8270C	03/02/05 20:29 / dsm	
Surr: Nitrobenzene-d5	93.0	%REC	J	23-120	SW8270C	03/02/05 20:29 / dsm	
Surr: Phenol-d5	95.0	%REC		24-113	SW8270C	03/02/05 20:29 / dsm	
Surr: Terphenyl-d14	102	%REC		18-137	SW8270C	03/02/05 20:29 / dsm	

- The sample extract would not concentrate to 1 mL and was brought to a 4 mL final volume. The sample extract was diluted an additional 2.5 times at analysis due to non-target compound sample matrix interference. The Reporting Limit reflects the sample extract final volume and the additional dilution.

Report Definitions:	RL - Analyte reporting limit. QCL - Quality control limit.	MCL - Maximum contaminant level. ND - Not detected at the reporting limit.
	J - Estimated value. The analyte was present but less than the reporting limit.	

LABORATORY ANALYTICAL REPORT

Client: Arrowhead Engineering
Project: Johnston Acres Investigation-Soil Borings
Lab ID: B05021091-002
Client Sample ID: CS-20036

Report Date: 03/11/05
Collection Date: 01/24/05
Date Received: 02/22/05
Matrix: Soil

Analyses	Result	Units	Qual	MCL/ RL QCL		Method	Analysis Date / By
				RL	QCL		
PHYSICAL CHARACTERISTICS							
Moisture	7.4	w%		0.01		SW3550A	02/25/05 11:08 / elf
EXTRACTABLE PETROLEUM HYDROCARBONS							
C9 to C18 Aliphatics	ND	mg/kg		20	100	MA-EPH	03/10/05 07:40 / pbf
C19 to C38 Aliphatics	131	mg/kg		20	2500	MA-EPH	03/10/05 07:40 / pbf
Sum: 1-Chloro-octadecane	33.8	%REC	S	40-140	MA-EPH		03/10/05 07:40 / pbf
C11 to C22 Aromatics	181	mg/kg	*	20	70	MA-EPH	03/10/05 08:29 / pbf
Total Extractable Hydrocarbons	540	mg/kg		20		MA-EPH	03/10/05 08:29 / pbf
Sum: 2-Bromonaphthalene	66.0	%REC		40-140	MA-EPH		03/10/05 08:29 / pbf
Sum: 2-Fluorobiphenyl	63.8	%REC		40-140	MA-EPH		03/10/05 08:29 / pbf
Sum: o-Terphenyl	31.2	%REC	S	40-140	MA-EPH		03/10/05 08:29 / pbf
- Note: Total Extractable Hydrocarbons are defined as the total hydrocarbon responses regardless of elution time. * =The reported value exceeds the Maximum Contaminant Limit (MCL). The MCLs listed for target analyte and hydrocarbon range values are the most conservative Montana DEQ RBSLs. These levels may not apply to your samples. S=Surrogate recovery below method control limits due to sample matrix interferences. Quantitative transfer of extract was not possible during extract filtration step. A low bias to final analytical results is expected.							
SEMI-VOLATILE ORGANIC COMPOUNDS							
1,2,4-Trichlorobenzene	ND	mg/kg		3.3		SW8270C	03/02/05 22:37 / dsm
1,2-Dichlorobenzene	ND	mg/kg		3.3		SW8270C	03/02/05 22:37 / dsm
1,3-Dichlorobenzene	ND	mg/kg		3.3		SW8270C	03/02/05 22:37 / dsm
1,4-Dichlorobenzene	ND	mg/kg		3.3		SW8270C	03/02/05 22:37 / dsm
1-Methylnaphthalene	ND	mg/kg		3.3		SW8270C	03/02/05 22:37 / dsm
2,4,6-Trichlorophenol	ND	mg/kg		3.3		SW8270C	03/02/05 22:37 / dsm
2,4,6-Trichlorophenol	ND	mg/kg		3.3		SW8270C	03/02/05 22:37 / dsm
2,4-Dichlorophenol	ND	mg/kg		3.3		SW8270C	03/02/05 22:37 / dsm
2,4-Dimethylphenol	ND	mg/kg		3.3		SW8270C	03/02/05 22:37 / dsm
2,4-Dinitrophenol	ND	mg/kg		17		SW8270C	03/02/05 22:37 / dsm
2,4-Dinitrotoluene	ND	mg/kg		3.3		SW8270C	03/02/05 22:37 / dsm
2,6-Dinitrotoluene	ND	mg/kg		3.3		SW8270C	03/02/05 22:37 / dsm
2-Chloronaphthalene	ND	mg/kg		3.3		SW8270C	03/02/05 22:37 / dsm
2-Chlorophenol	ND	mg/kg		3.3		SW8270C	03/02/05 22:37 / dsm
2-Methylnaphthalene	ND	mg/kg		3.3		SW8270C	03/02/05 22:37 / dsm
2-Nitrophenol	ND	mg/kg		3.3		SW8270C	03/02/05 22:37 / dsm
3,3'-Dichlorobenzidine	ND	mg/kg		8.7		SW8270C	03/02/05 22:37 / dsm
4,6-Dinitro-2-methylphenol	ND	mg/kg		17		SW8270C	03/02/05 22:37 / dsm
4-Bromophenyl phenyl ether	ND	mg/kg		3.3		SW8270C	03/02/05 22:37 / dsm
4-Chloro-3-methylphenol	ND	mg/kg		3.3		SW8270C	03/02/05 22:37 / dsm
4-Chlorophenol	ND	mg/kg		3.3		SW8270C	03/02/05 22:37 / dsm
4-Chlorophenyl phenyl ether	ND	mg/kg		3.3		SW8270C	03/02/05 22:37 / dsm
4-Nitrophenol	ND	mg/kg		17		SW8270C	03/02/05 22:37 / dsm

Report RL - Analyte reporting limit.
 Definitions: QCL - Quality control limit.
 * - The result exceeds the MCL.

MCL - Maximum contaminant level.
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 S - Spike recovery outside of advisory limits.



LABORATORY ANALYTICAL REPORT

Client: Arrowhead Engineering
Project: Johnston Acres Investigation-Soil Borings
Lab ID: B05021091-002
Client Sample ID: CS-20036

Report Date: 03/11/05
Collection Date: 01/24/05
Date Received: 02/22/05
Matrix: Soil

Analyses	Result	Units	Qual	RL	MCL/ QCL	Method	Analysis Date / By
SEMI-VOLATILE ORGANIC COMPOUNDS							
Aceanaphthalene	ND	mg/kg		3.3	SW8270C		03/02/05 22:37 / dsm
Acenaphthylene	ND	mg/kg		3.3	SW8270C		03/02/05 22:37 / dsm
Anthracene	ND	mg/kg		3.3	SW8270C		03/02/05 22:37 / dsm
Azobenzene	ND	mg/kg		3.3	SW8270C		03/02/05 22:37 / dsm
Benzidine	ND	mg/kg		6.7	SW8270C		03/02/05 22:37 / dsm
Benzo(a)anthracene	ND	mg/kg		3.3	SW8270C		03/02/05 22:37 / dsm
Benzo(a)pyrene	ND	mg/kg		3.3	SW8270C		03/02/05 22:37 / dsm
Benzo(b)fluoranthene	ND	mg/kg		3.3	SW8270C		03/02/05 22:37 / dsm
Benzo(g,h,i)perylene	ND	mg/kg		3.3	SW8270C		03/02/05 22:37 / dsm
Benzo(k)fluoranthene	ND	mg/kg		3.3	SW8270C		03/02/05 22:37 / dsm
bis(-2-chloroethoxy)Methane	ND	mg/kg		3.3	SW8270C		03/02/05 22:37 / dsm
bis(-2-chloroethyl)Ether	ND	mg/kg		3.3	SW8270C		03/02/05 22:37 / dsm
bis(2-chloroisopropyl)Ether	ND	mg/kg		3.3	SW8270C		03/02/05 22:37 / dsm
bis(2-ethylhexyl)Phthalate	ND	mg/kg		3.3	SW8270C		03/02/05 22:37 / dsm
Butylbenzylphthalate	ND	mg/kg		3.3	SW8270C		03/02/05 22:37 / dsm
Chrysene	ND	mg/kg		3.3	SW8270C		03/02/05 22:37 / dsm
Dibenzo(a,h)anthracene	ND	mg/kg		3.3	SW8270C		03/02/05 22:37 / dsm
Diethyl phthalate	ND	mg/kg		3.3	SW8270C		03/02/05 22:37 / dsm
Dimethyl phthalate	ND	mg/kg		3.3	SW8270C		03/02/05 22:37 / dsm
Di-n-butyl phthalate	ND	mg/kg		3.3	SW8270C		03/02/05 22:37 / dsm
O-t-n-octyl phthalate	ND	mg/kg		3.3	SW8270C		03/02/05 22:37 / dsm
Fluoranthene	ND	mg/kg		3.3	SW8270C		03/02/05 22:37 / dsm
Fluorene	ND	mg/kg		3.3	SW8270C		03/02/05 22:37 / dsm
Hexachlorobenzene	ND	mg/kg		3.3	SW8270C		03/02/05 22:37 / dsm
Hexachlorobutadiene	ND	mg/kg		3.3	SW8270C		03/02/05 22:37 / dsm
Hexachlorocyclopentadiene	ND	mg/kg		6.7	SW8270C		03/02/05 22:37 / dsm
Hexachlorobutane	ND	mg/kg		3.3	SW8270C		03/02/05 22:37 / dsm
Indeno(1,2,3-cd)pyrene	ND	mg/kg		3.3	SWB270C		03/02/05 22:37 / dsm
Isophorone	ND	mg/kg		3.3	SWB270C		03/02/05 22:37 / dsm
m+p-Cresols	ND	mg/kg		3.3	SWB270C		03/02/05 22:37 / dsm
Naphthalene	ND	mg/kg		3.3	SWB270C		03/02/05 22:37 / dsm
Nitrobenzene	ND	mg/kg		3.3	SWB270C		03/02/05 22:37 / dsm
n-Nitrosodimethylamine	ND	mg/kg		3.3	SWB270C		03/02/05 22:37 / dsm
n-Nitrosodi-n-propylamine	ND	mg/kg		3.3	SWB270C		03/02/05 22:37 / dsm
n-Nitrosodiphenylamine	ND	mg/kg		3.3	SWB270C		03/02/05 22:37 / dsm
o-Cresol	ND	mg/kg		3.3	SWB270C		03/02/05 22:37 / dsm
Pentachlorophenol	ND	mg/kg		17	SWB270C		03/02/05 22:37 / dsm
Phenanthrene	ND	mg/kg		3.3	SWB270C		03/02/05 22:37 / dsm
Phenol	ND	mg/kg		3.3	SWB270C		03/02/05 22:37 / dsm
Pyrene	ND	mg/kg		3.3	SWB270C		03/02/05 22:37 / dsm
Pyridine	ND	mg/kg		6.7	SWB270C		03/02/05 22:37 / dsm

Report RL - Analyte reporting limit.
Definitions: QCL - Quality control limit.

MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.



LABORATORY ANALYTICAL REPORT

Client: Arrowhead Engineering
Project: Johnston Acres Investigation-Soil Borings
Lab ID: B05021091-002
Client Sample ID: CS-20036

Report Date: 03/11/05
Collection Date: 01/24/05
Date Received: 02/22/05
Matrix: Soil

Analyses	Result	Units	Qual	MCL/		Method	Analysis Date / By
				RL	QCL		
SEMI-VOLATILE ORGANIC COMPOUNDS							
Sur: 2,4,6-Tribromophenol	83.0	%REC		19-122	SW8270C	03/02/05 22:37 / dsm	
Sur: 2-Fluorobiphenyl	96.9	%REC	J	30-115	SW8270C	03/02/05 22:37 / dsm	
Sur: 2-Fluorophenol	90.5	%REC		26-121	SW8270C	03/02/05 22:37 / dsm	
Sur: Nitrobenzene-d5	93.4	%REC	J	23-120	SW8270C	03/02/05 22:37 / dsm	
Sur: Phenol-d5	94.0	%REC		24-113	SW8270C	03/02/05 22:37 / dsm	
Sur: Terphenyl-d14	96.9	%REC	J	18-137	SW8270C	03/02/05 22:37 / dsm	

- The sample extract would not concentrate to 1 ml and was brought to a 4 ml final volume. The sample extract was diluted an additional 2.5 times at analysis due to non-target compound sample matrix interference. The Reporting Limit reflects the sample extract final volume and the additional dilution.

Report Definitions:	RL - Analyte reporting limit. QCL - Quality control limit.	MCL - Maximum contaminant level. ND - Not detected at the reporting limit.
	J - Estimated value. The analyte was present but less than the reporting limit.	



QA/QC Summary Report

Client: Arrowhead Engineering

Report Date: 03/03/05

Project: Johnston Acres Investigation-Soil Borings

Work Order: B05021091

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPLimit	Qual
Method: SW8270C									
Sample ID: MB-14651	Method Blank								Batch: 14651
1,2,4-Trichlorobenzene	ND	mg/kg	0.33						03/02/05 10:14
1,2-Dichlorobenzene	ND	mg/kg	0.33						
1,3-Dichlorobenzene	ND	mg/kg	0.33						
1,4-Dichlorobenzene	ND	mg/kg	0.33						
1-Methylnaphthalene	ND	mg/kg	0.33						
2,4,5-Trichlorophenol	ND	mg/kg	0.33						
2,4,6-Trichlorophenol	ND	mg/kg	0.33						
2,4-Dichlorophenol	ND	mg/kg	0.33						
2,4-Dimethylphenol	ND	mg/kg	0.33						
2,4-Dinitrophenol	ND	mg/kg	1.7						
2,4-Dinitrotoluene	ND	mg/kg	0.33						
2,6-Dinitrotoluene	ND	mg/kg	0.33						
2-Chloronaphthalene	ND	mg/kg	0.33						
2-Chlorophenol	ND	mg/kg	0.33						
2-Methylnaphthalene	ND	mg/kg	0.33						
2-Nitrophenol	ND	mg/kg	0.33						
3,3'-Dichlorobenzidine	ND	mg/kg	0.87						
4,6-Dinitro-2-methylphenol	ND	mg/kg	1.7						
4-Bromophenyl phenyl ether	ND	mg/kg	0.33						
4-Chloro-3-methylphenol	ND	mg/kg	0.33						
4-Chlorophenol	ND	mg/kg	0.33						
4-Chlorophenyl phenyl ether	ND	mg/kg	0.33						
4-Nitrophenol	ND	mg/kg	1.7						
Aacenaphthylene	ND	mg/kg	0.33						
Anthracene	ND	mg/kg	0.33						
Azobenzene	ND	mg/kg	0.33						
Benzidine	ND	mg/kg	0.67						
Benzo(a)anthracene	ND	mg/kg	0.33						
Benzo(a)pyrene	ND	mg/kg	0.33						
Benzo(b)fluoranthene	ND	mg/kg	0.33						
Benzo(g,h,i)perylene	ND	mg/kg	0.33						
Benzo(k)fluoranthene	ND	mg/kg	0.33						
bis(2-chloroethyl)Methane	ND	mg/kg	0.33						
bis(2-chloroethyl)Ether	ND	mg/kg	0.33						
bis(2-chloroisopropyl)Ether	ND	mg/kg	0.33						
bis(2-ethylhexyl)Phthalate	ND	mg/kg	0.33						
Butylbenzylphthalate	ND	mg/kg	0.33						
Chrysene	ND	mg/kg	0.33						
Dibenz(a,h)anthracene	ND	mg/kg	0.33						

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.



QA/QC Summary Report

Client: Arrowhead Engineering

Report Date: 03/03/05

Project: Johnston Acres Investigation-Soil Borings

Work Order: B05021091

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: SW8270C									Batch: 14651
Sample ID: MB-14651	Method Blank								03/02/05 16:14
Diethyl phthalate	ND	mg/kg	0.33						
Dimethyl phthalate	ND	mg/kg	0.33						
Di-n-butyl phthalate	ND	mg/kg	0.33						
Di-n-petyl phthalate	ND	mg/kg	0.33						
Fluoranthene	ND	mg/kg	0.33						
Fluorene	ND	mg/kg	0.33						
Hexachlorobenzene	ND	mg/kg	0.33						
Hexachlorobutadiene	ND	mg/kg	0.33						
Hexachlorocyclopentadiene	ND	mg/kg	0.67						
Hexachloroethane	ND	mg/kg	0.33						
Indeno(1,2,3-cd)pyrene	ND	mg/kg	0.33						
Isoaphorone	ND	mg/kg	0.33						
m+p-Cresols	ND	mg/kg	0.33						
Naphthalene	ND	mg/kg	0.33						
Nitrobenzene	ND	mg/kg	0.33						
n-Nitrosodimethylamine	ND	mg/kg	0.33						
n-Nitroso-di-n-propylamine	ND	mg/kg	0.33						
n-Nitrosodiphenylamine	ND	mg/kg	0.33						
o-Cresol	ND	mg/kg	0.33						
Perachlorophenol	ND	mg/kg	1.7						
Phenanthrene	ND	mg/kg	0.33						
Phenol	ND	mg/kg	0.33						
Pyrene	ND	mg/kg	0.33						
Pyridine	ND	mg/kg	0.67						
Sum: 2,4,6-Tribromophenol			0.33	99	19	122			
Sum: 2-Fluorobiphenyl			0.33	85.9	30	115			
Sur: 2-Fluorophenol			0.33	87.5	25	121			
Sur: Nitrobenzene-d5			0.33	85.3	23	120			
Sur: Phenol-d5			0.33	82	24	113			
Sur: Terphenyl-d14			0.33	99.5	18	137			
Sample ID: LC3-14651	Laboratory Control Spike								03/02/05 16:56
1,2,4-Trichlorobenzene	2.41	mg/kg	0.33	72.3	46	94			
1,2-Dichlorobenzene	2.18	mg/kg	0.33	65.5	32	89			
1,3-Dichlorobenzene	2.07	mg/kg	0.33	62.2	28	95			
1,4-Dichlorobenzene	2.16	mg/kg	0.33	65	26	101			
2,4,5-Trichlorophenol	2.84	mg/kg	0.33	85.4	34	123			
2,4,6-Trichlorophenol	2.77	mg/kg	0.33	83.1	34	123			
2,4-Dichlorophenol	2.58	mg/kg	0.33	77.4	32	110			
2,4-Dimethylphenol	2.48	mg/kg	0.33	74.6	31	95			
2,4-Dinitrophenol	3.09	mg/kg	1.7	92.7	10	122			

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.



QA/QC Summary Report

Client: Arrowhead Engineering

Report Date: 03/03/05

Project: Johnston Acres Investigation-Soil Borings

Work Order: B05021091

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: SW8270C									Batch: 14851
Sample ID: LCS-14851	Laboratory Control Spike								03/02/05 16:58
2,4-Dinitrotoluene	3.11	mg/kg	0.33	93.4	47	118			
2,6-Dinitrotoluene	2.95	mg/kg	0.33	88.6	50	116			
2-Chloronaphthalene	2.69	mg/kg	0.33	80.7	53	98			
2-Chlorophenol	2.00	mg/kg	0.33	76.8	30	104			
2-Methylnaphthalene	2.51	mg/kg	0.33	76.3	30	130			
2-Nitrophenol	2.42	mg/kg	0.33	72.8	35	97			
4,6-Dinitro-2-methylphenol	3.40	mg/kg	1.7	102	10	121			
4-Bromophenyl phenyl ether	2.89	mg/kg	0.33	86.8	54	108			
4-Chloro-3-methylphenol	2.63	mg/kg	0.33	85	41	118			
4-Chlorophenyl phenyl ether	2.90	mg/kg	0.33	87	49	110			
4-Nitrophenol	3.40	mg/kg	1.7	102	19	120			
Acenaphthene	2.82	mg/kg	0.33	84.7	51	112			
Acenaphthylene	2.70	mg/kg	0.33	81.1	45	106			
Anthracene	3.31	mg/kg	0.33	99.5	51	114			
Azobenzene	3.28	mg/kg	0.33	98.4	10	227			
Benz(a)anthracene	3.10	mg/kg	0.33	93.1	53	119			
Benz(a)pyrene	2.93	mg/kg	0.33	88.1	48	121			
Benz(b)fluoranthene	3.11	mg/kg	0.33	83.3	48	122			
Benz(g,h)perylene	2.93	mg/kg	0.33	88	46	116			
Benz(k)fluoranthene	2.80	mg/kg	0.33	78	47	121			
bis(2-chloroethoxy)Methane	2.66	mg/kg	0.33	79.8	29	121			
bis(2-chloroethyl)Ether	2.51	mg/kg	0.33	75.3	20	118			
bis(2-chloroacpropyl)Ether	2.32	mg/kg	0.33	69.8	33	103			
bis(2-ethylhexyl)Phthalate	3.21	mg/kg	0.33	96.5	52	120			
Butylbenzylphthalate	3.28	mg/kg	0.33	97.9	50	121			
Chrysene	3.04	mg/kg	0.33	91.4	53	124			
Dibenzo(a,h)anthracene	3.05	mg/kg	0.33	91.7	41	118			
Diethyl phthalate	3.01	mg/kg	0.33	90.4	50	111			
Dimethyl phthalate	2.92	mg/kg	0.33	87.8	51	112			
Di-n-butyl phthalate	2.97	mg/kg	0.33	89.3	50	113			
Di-n-octyl phthalate	3.10	mg/kg	0.33	95	50	128			
Fluoranthene	2.97	mg/kg	0.33	89.3	54	119			
Fluorene	2.92	mg/kg	0.33	87.6	53	109			
Hexachlorobenzene	2.75	mg/kg	0.33	82.7	43	114			
Hexachlorobutadiene	2.25	mg/kg	0.33	67.6	44	105			
Hexachlorocyclopentadiene	2.58	mg/kg	0.67	77.4	21	98			
Hexachloroethane	2.27	mg/kg	0.33	69.1	31	106			
Indeno(1,2,3-cd)pyrene	3.02	mg/kg	0.33	90.8	24	130			
Isoeophorone	2.61	mg/kg	0.33	78.4	24	130			
m+p-Grease	2.80	mg/kg	0.33	78	30	130			

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Client: Arrowhead Engineering

Report Date: 03/03/05

Project: Johnston Acres Investigation-Soil Borings

Work Order: B05021091

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: SW8270C								Batch: 14651	
Sample ID: LCS-14651								03/02/05 16:58	
Laboratory Control Spike									
Naphthalene	2.44	mg/kg	0.33	73.3	32	116			
Nitrobenzene	2.45	mg/kg	0.33	73.6	21	123			
n-Nitrosodimethylamine	2.10	mg/kg	0.33	63.1	17	109			
n-Nitroso-di-n-propylamine	2.90	mg/kg	0.33	87.1	10	139			
o-Cresol	2.82	mg/kg	0.33	78.8	30	130			
Pentachlorophenol	3.12	mg/kg	1.7	93.8	10	114			
Phenanthrene	3.14	mg/kg	0.33	94.3	57	109			
Phenol	2.70	mg/kg	0.33	81.2	22	115			
Pyrene	3.14	mg/kg	0.33	94.2	59	117			
Sum: 2,4,6-Tribromophenol			0.33	97	19	122			
Sur: 2-Fluorobiphenyl			0.33	86.2	30	115			
Sur: 2-Fluorophenol			0.33	80.5	25	121			
Sur: Nitrobenzene-d5			0.33	78.2	23	120			
Sur: Phenol-d5			0.33	80.5	24	113			
Sur: Terphenyl-d14			0.33	98.9	18	137			
Sample ID: B05021091-001AMS								03/02/05 21:12	
Sample Matrix Spike									
1,2,4-Trichlorobenzene	3.02	mg/kg	3.3	90.6	38	107			
1,4-Dichlorobenzene	2.73	mg/kg	3.3	81.9	28	104			
2,4-Dinitrotoluene	2.78	mg/kg	3.3	83.5	28	89			
2-Chlorophenol	4.60	mg/kg	3.3	92	25	102			
4-Chloro-3-methylphenol	4.93	mg/kg	3.3	98.7	26	103			
4-Nitrophenol	3.90	mg/kg	17	78	11	114			
Acenaphthene	3.37	mg/kg	3.3	101	31	137			
n-Nitroso-di-n-propylamine	3.60	mg/kg	3.3	108	41	126			
Pentachlorophenol	3.70	mg/kg	17	74	17	109			
Phenol	4.70	mg/kg	3.3	94	26	90			S
Pyrene	3.90	mg/kg	3.3	101	35	142			
Sum: 2,4,6-Tribromophenol			3.3	97.5	19	122			
Sur: 2-Fluorobiphenyl			3.3	103	30	115			
Sur: 2-Fluorophenol			3.3	97	25	121			
Sur: Nitrobenzene-d5			3.3	87.8	23	120			
Sur: Phenol-d5			3.3	100	24	113			
Sur: Terphenyl-d14			3.3	100	18	137			
- The sample extract would not concentrate to 1 ml and was brought to a 4 ml final volume. The sample extract was diluted an additional 2.5 times at analysis due to non-target compound sample matrix interference. The Reporting Limit reflects the sample extract final volume and the additional dilution.									
Sample ID: B05021091-001AMSD								03/02/05 21:54	
Sample Matrix Spike Duplicate									
1,2,4-Trichlorobenzene	3.20	mg/kg	3.3	98.1	38	107	0	23	
1,4-Dichlorobenzene	2.64	mg/kg	3.3	79.3	28	104	0	27	
2,4-Dinitrotoluene	2.80	mg/kg	3.3	84	28	89	0	47	
2-Chlorophenol	4.67	mg/kg	3.3	93.3	25	102	1.4	50	

Qualifiers:

RL - Analyte reporting limit.

S - Spike recovery outside of advisory limits.

ND - Not detected at the reporting limit.



QA/QC Summary Report

Client: Arrowhead Engineering

Report Date: 03/03/05

Project: Johnston Acres Investigation-Soil Borings

Work Order: B05021091

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: SW8270C								Batch: 14651	
Sample ID: B05021091-001AMSD Sample Matrix Spike Duplicate								03/02/05 21:54	
4-Chloro-3-methylphenol	5.37	mg/kg	3.3	107	26	103	8.4	33	S
4-Nitrophenol	5.07	mg/kg	17	101	11	114	0	50	
Acenaphthene	3.57	mg/kg	3.3	107	31	137	5.6	19	
n-Nitroso-di-n-propylamine	4.47	mg/kg	3.3	134	41	128	21	38	S
Pentachlorophenol	3.80	mg/kg	17	72	17	108	0	47	
Phenol	4.87	mg/kg	3.3	97.3	26	90	3.5	35	S
Pyrene	4.13	mg/kg	3.3	108	35	142	5.8	36	
Sur: 2,4,6-Tribromophenol			3.3	22.5	19	122			
Sur: 2-Fluorobiphenyl			3.3	99.6	30	115			
Sur: 2-Fluorophenol			3.3	91	25	121			
Sur: Nitrobenzene-d5			3.3	113	23	120			
Sur: Phenol-d5			3.3	101	24	113			
Sur: Terphenyl-d14			3.3	98.9	18	137			

- The sample extract would not concentrate to 1 ml and was brought to a 4 ml final volume. The sample extract was diluted an additional 2.5 times at analysis due to non-target compound sample matrix interference. The Reporting Limit reflects the sample extract final volume and the additional dilution.

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

S - Spike recovery outside of advisory limits.



QA/QC Summary Report

Client: Arrowhead Engineering

Report Date: 03/11/05

Project: Johnston Acres Investigation-Soil Borings

Work Order: B05021091

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: MA-EPH									
Sample ID: MB-14773-14816	Method Blank								Batch: 14773
C9 to C18 Aliphatics	ND	mg/kg	10						03/09/05 16:38
C19 to C38 Aliphatics	ND	mg/kg	10						
Sum: 1-Chloro-octadecane			0.17	90.4	40	140			
Sample ID: LCS-14773-14816	Laboratory Control Spike								03/09/05 21:15
n-Decane	2.20	mg/kg	0.17	33	40	140			S
n-Dodecane	2.82	mg/kg	0.17	42.3	40	140			
n-Tetradecane	3.58	mg/kg	0.17	53.7	40	140			
n-Hexadecane	4.08	mg/kg	0.17	61.2	40	140			
n-Octadecane	4.82	mg/kg	0.17	72.3	40	140			
n-Eicosane	5.40	mg/kg	0.17	81	40	140			
n-Docosane	5.81	mg/kg	0.17	84.1	40	140			
n-Tetracosane	5.93	mg/kg	0.17	89	40	140			
n-Hexacosane	5.85	mg/kg	0.17	87.8	40	140			
n-Octacosane	5.81	mg/kg	0.17	87.1	40	140			
Sum: 1-Chloro-octadecane			0.17	76.4	40	140			
Sample ID: B05021135-002AMS	Sample Matrix Spike								03/09/05 22:50
n-Decane	3.67	mg/kg	0.17	53.5	40	140			
n-Dodecane	4.60	mg/kg	0.17	69	40	140			
n-Tetradecane	5.54	mg/kg	0.17	83.1	40	140			
n-Hexadecane	6.04	mg/kg	0.17	80.0	40	140			
n-Octadecane	6.91	mg/kg	0.17	104	40	140			
n-Eicosane	7.78	mg/kg	0.17	118	40	140			
n-Decosane	8.06	mg/kg	0.17	121	40	140			
n-Tetracosane	8.42	mg/kg	0.17	126	40	140			
n-Hexacosane	8.32	mg/kg	0.17	128	40	140			
n-Octacosane	8.26	mg/kg	0.17	124	40	140			
Sum: 1-Chloro-octadecane			0.17	109	40	140			
High bias to Matrix Spike recoveries attributed to solvent evaporation from broken autosampler vial.									
Sample ID: B05021135-002AMSD	Sample Matrix Spike Duplicate								03/10/05 02:03
n-Decane	2.61	mg/kg	0.17	39.2	40	140	31	40	S
n-Dodecane	3.30	mg/kg	0.17	49.5	40	140	33	40	
n-Tetradecane	4.31	mg/kg	0.17	64.7	40	140	25	30	
n-Hexadecane	4.70	mg/kg	0.17	70.6	40	140	25	20	R
n-Octadecane	5.39	mg/kg	0.17	80.9	40	140	25	20	R
n-Eicosane	5.52	mg/kg	0.17	82.8	40	140	34	20	R
n-Decosane	5.60	mg/kg	0.17	84.1	40	140	36	20	R
n-Tetracosane	5.96	mg/kg	0.17	89.4	40	140	34	20	R
n-Hexacosane	5.82	mg/kg	0.17	87.3	40	140	35	20	R
n-Octacosane	5.78	mg/kg	0.17	88.4	40	140	36	20	R

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

R - RPD exceeds advisory limit.

S - Spike recovery outside of advisory limits.



QA/QC Summary Report

Client: Arrowhead Engineering

Report Date: 03/11/05

Project: Johnston Acres Investigation-Soil Borings

Work Order: B05021091

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: MA-EPH	Batch: 14773								
Sample ID: B05021135-002AMSD	Sample Matrix Spike Duplicate								
Surr: 1-Chloro-octadecane	0.17		77.1		40	140			03/10/05 02:03
RPD out of control limits due to high bias in MS analyses results from faulty subsampler vial.									
Sample ID: MB-14773-14616	Method Blank								
C11 to C22 Aromatics	ND	mg/kg		10					03/09/05 19:47
Total Extractable Hydrocarbons	ND	mg/kg		10					
Naphthalene	ND	mg/kg	0.17						
2-MethylNaphthalene	ND	mg/kg	0.17						
Acenaphthylene	ND	mg/kg	0.17						
Acenaphthene	ND	mg/kg	0.17						
Fluorene	ND	mg/kg	0.17						
Phenanthrene	ND	mg/kg	0.17						
Anthracene	ND	mg/kg	0.17						
Fluoranthene	ND	mg/kg	0.17						
Pyrene	ND	mg/kg	0.17						
Benzo(a)Anthracene	ND	mg/kg	0.17						
Chrysene	ND	mg/kg	0.17						
Benzo(b)Fluoranthene/Benzo(k)Fluoran	ND	mg/kg	0.17						
Benzo(a)Pyrene	ND	mg/kg	0.17						
Dibenz(a,h)anthracene/Indeno(1,2,3-cd)	ND	mg/kg	0.17						
Benzo(g,h,i)perylene	ND	mg/kg	0.17						
Sum: 2-Bromonaphthalene	0.17		85.6		40	140			
Sum: 2-Fluorobiphenyl	0.17		88.1		40	140			
Sum: o-Terphenyl	0.17		94.1		40	140			
Sample ID: LCB-14773-14616	Laboratory Control Spike								
Naphthalene	2.36	mg/kg	0.17	35.4	40	140			03/09/05 22:03
Acenaphthylene	3.41	mg/kg	0.17	51.1	40	140			S
Acenaphthene	3.36	mg/kg	0.17	50.4	40	140			
Fluorene	3.60	mg/kg	0.17	54	40	140			
Phenanthrene	3.91	mg/kg	0.17	58.7	40	140			
Anthracene	4.21	mg/kg	0.17	63.2	40	140			
Fluoranthene	4.62	mg/kg	0.17	69.3	40	140			
Pyrene	4.74	mg/kg	0.17	71	40	140			
Benzo(a)Anthracene	4.67	mg/kg	0.17	70	40	140			
Chrysene	5.08	mg/kg	0.17	78.2	40	140			
Benzo(b)Fluoranthene/Benzo(k)Fluoran	10.2	mg/kg	0.17	78.4	40	140			
Benzo(a)Pyrene	4.86	mg/kg	0.17	69.9	40	140			
Dibenz(a,h)anthracene/Indeno(1,2,3-cd)	9.48	mg/kg	0.17	71.1	40	140			
Benzo(g,h,i)perylene	4.92	mg/kg	0.17	73.9	40	140			
Sum: 2-Bromonaphthalene	0.17		60.3		40	140			

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

S - Spike recovery outside of advisory limits.



QA/QC Summary Report

Client: Arrowhead Engineering

Report Date: 03/11/05

Project: Johnston Acres Investigation-Soil Borings

Work Order: B05021091

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPD Limit	Qual
Method: MA-EPH									Batch: 14773
Sample ID: LCS-14773-14816 Laboratory Control Spike									03/09/05 22:03
Sum: 2-Fluorobiphenyl			0.17	60.8	40	140			
Sum: o-Terphenyl			0.17	64.8	40	140			
Sample ID: B05021135-002AMS Sample Matrix Spike									03/10/05 01:15
Naphthalene	3.31	mg/kg	0.17	49.6	40	140			
Acenaphthylene	4.57	mg/kg	0.17	68.5	40	140			
Acenaphthene	4.41	mg/kg	0.17	66.2	40	140			
Fluorene	4.70	mg/kg	0.17	70.5	40	140			
Phenanthrene	5.04	mg/kg	0.17	75.6	40	140			
Anthracene	5.53	mg/kg	0.17	83	40	140			
Fluoranthene	5.82	mg/kg	0.17	88.8	40	140			
Pyrene	6.08	mg/kg	0.17	90.9	40	140			
Benz(a)Anthracene	6.02	mg/kg	0.17	90.4	40	140			
Chrysene	6.47	mg/kg	0.17	97	40	140			
Benz(b)Fluoranthene/Benzo(k)Fluoran	12.8	mg/kg	0.17	95.8	40	140			
Benz(a)Pyrene	6.06	mg/kg	0.17	91	40	140			
Dibenz(a,h)anthraene/Indeno(1,2,3-cd	12.7	mg/kg	0.17	95.5	40	140			
Benz(g,h)perylene	6.33	mg/kg	0.17	95	40	140			
Sum: 2-Bromonaphthalene			0.17	74.7	40	140			
Sum: 2-Fluorobiphenyl			0.17	77.2	40	140			
Sum: o-Terphenyl			0.17	81.5	40	140			
Sample ID: B05021135-002AMSD Sample Matrix Spike Duplicate									03/10/05 02:51
Naphthalene	2.87	mg/kg	0.17	44.6	40	140	11	40	
Acenaphthylene	4.18	mg/kg	0.17	62.7	40	140	8.9	20	
Acenaphthene	4.04	mg/kg	0.17	60.6	40	140	8.7	20	
Fluorene	4.38	mg/kg	0.17	65.7	40	140	7.1	20	
Phenanthrene	4.60	mg/kg	0.17	68.9	40	140	9.2	20	
Anthracene	5.01	mg/kg	0.17	76.2	40	140	9.9	20	
Fluoranthene	5.33	mg/kg	0.17	79.9	40	140	10	20	
Pyrene	5.47	mg/kg	0.17	82	40	140	10	20	
Benz(a)Anthracene	5.35	mg/kg	0.17	80.2	40	140	12	20	
Chrysene	5.75	mg/kg	0.17	88.3	40	140	12	20	
Benz(b)Fluoranthene/Benzo(k)Fluoran	11.3	mg/kg	0.17	84.9	40	140	12	20	
Benz(a)Pyrene	5.36	mg/kg	0.17	80.4	40	140	12	20	
Dibenz(a,h)anthraene/Indeno(1,2,3-cd	11.3	mg/kg	0.17	84.7	40	140	12	20	
Benz(g,h)perylene	5.60	mg/kg	0.17	84.1	40	140	12	20	
Sum: 2-Bromonaphthalene			0.17	64.9	40	140			
Sum: 2-Fluorobiphenyl			0.17	64	40	140			
Sum: o-Terphenyl			0.17	74.1	40	140			

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Client: Arrowhead Engineering

Report Date: 03/11/05

Project: Johnston Acres Investigation-Soil Bodings

Work Order: B05021091

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: MA-EPH	Analytical Run: GCFID-PISON-B_060309B								
Sample ID: CCV_0309FIS14r-S	Continuing Calibration Verification Standard								03/10/05 03:40
n-Nonane	6.75	mg/kg	0.17	101	75	125			
n-Decane	6.81	mg/kg	0.17	102	75	125			
n-Dodecane	6.48	mg/kg	0.17	96.9	75	125			
n-Tetradecane	6.71	mg/kg	0.17	101	75	125			
n-Hexadecane	6.45	mg/kg	0.17	96.9	75	125			
n-Octadecane	6.56	mg/kg	0.17	98.4	75	126			
n-Nonadecane	6.68	mg/kg	0.17	100	75	125			
n-Eicosane	6.77	mg/kg	0.17	101	75	125			
n-Docosane	6.90	mg/kg	0.17	104	75	125			
n-Tetracosane	6.90	mg/kg	0.17	104	75	125			
n-Hexacosane	6.88	mg/kg	0.17	103	75	125			
n-Octacosane	6.89	mg/kg	0.17	103	75	125			
n-Tricontane	6.98	mg/kg	0.17	104	75	125			
n-Hexaitaconane	6.98	mg/kg	0.17	105	75	125			
Surrogate: 1-Chloro-octadecane			0.17	102	75	125			
Sample ID: CCV_0309FIS15r-S	Continuing Calibration Verification Standard								03/10/05 04:26
Naphthalene	6.43	mg/kg	0.17	96.6	75	125			
2-MethylNaphthalene	6.38	mg/kg	0.17	95.7	75	125			
Acenaphthylene	6.43	mg/kg	0.17	98.4	75	126			
Acenaphthene	6.68	mg/kg	0.17	100	75	125			
Fluorene	6.56	mg/kg	0.17	98.4	75	125			
Phenanthrene	6.48	mg/kg	0.17	96.9	75	125			
Anthracene	6.43	mg/kg	0.17	98.4	75	125			
Fluoranthene	6.71	mg/kg	0.17	101	75	125			
Pyrene	6.69	mg/kg	0.17	100	75	125			
Benzo(a)Anthracene	8.60	mg/kg	0.17	99	75	125			
Chrysene	7.03	mg/kg	0.17	105	75	125			
Benzo(b)Fluoranthene/Benzo(k)Fluoran	13.5	mg/kg	0.17	102	75	125			
Benzo(a)Pyrene	6.62	mg/kg	0.17	99.4	75	125			
Dibenzo(a,h)anthracene/Indeno(1,2,3-cd)	13.5	mg/kg	0.17	102	75	125			
Benzo(g,h,i)perylene	6.71	mg/kg	0.17	101	75	125			
Surrogate: 2-Bromonaphthalene			0.17	90.9	75	125			
Surrogate: 2-Fluorobiphenyl			0.17	91	75	125			
Surrogate: o-Terphenyl			0.17	97.3	75	125			

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

Energy Laboratories Inc

DATES REPORT

11-Mar-05

Lab Order: B05021091
Client: Arrowhead Engineering
Project: Johnston Acres Investigation-Soil

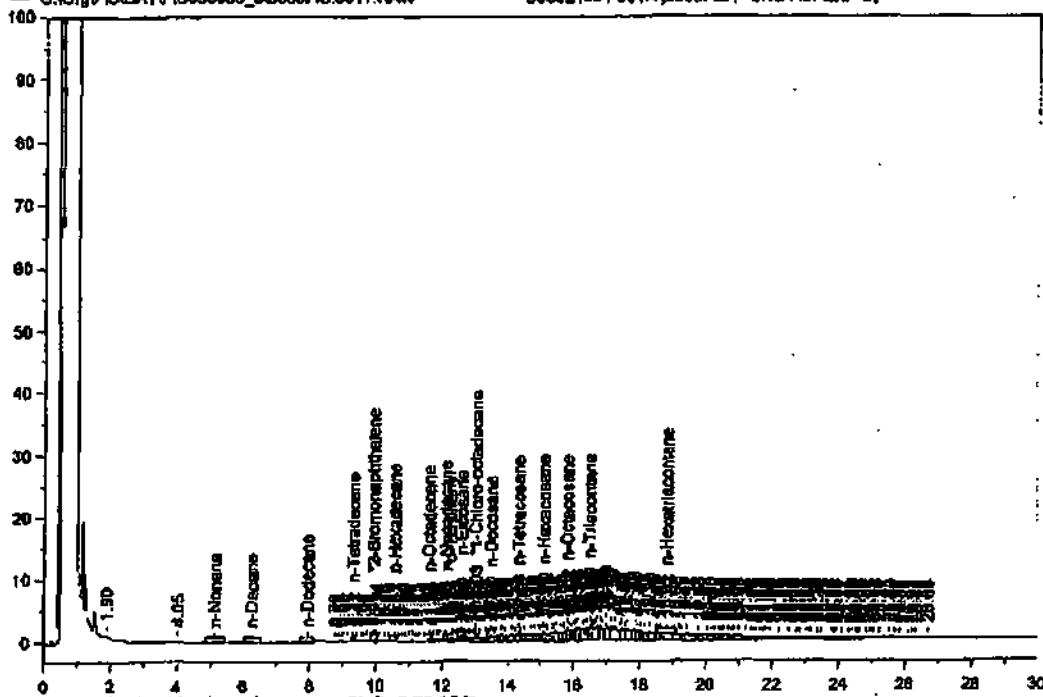
Sample ID	Client Sample ID	Collection Date	Matrix	Test Name	TCLP Date	Prep Date Method Batch	Analysis Date
B05021091-001A	CS-20027	1/24/2005	Soil	Hydrocarbons, Extractable Petroleum	03/08/2005 MA-EPII [14773]	3/10/2005	
				Hydrocarbons, Extractable Petroleum	03/08/2005 MA-EPH [14773]	3/10/2005	
				Moisture	02/24/2005 SW3550A [14615]	2/25/2005	
				Semi-Volatile Organic Compounds	02/28/2005 SW8270C [14631]	3/2/2005	
B05021091-002A	CS-20036			Hydrocarbons, Extractable Petroleum	03/08/2005 MA-EPH [14773]	3/10/2005	
				Hydrocarbons, Extractable Petroleum	03/08/2005 MA-EPH [14773]	3/10/2005	
				Moisture	02/24/2005 SW3550A [14615]	2/25/2005	
				Semi-Volatile Organic Compounds	02/28/2005 SW8270C [14631]	3/2/2005	

C5-20027

— G:\OneDrive\DATA\FI\5090905_6x0308F16.0017.RAW

Batch ID: 14773

B05021091-001A ;0900FIS . SHG-ALL-GRP-8.



EPH ALIPHATICS (FID) ANALYSIS REPORT

Sample Name: B05021091-001A ;0309FIS , SHC-ALI-GRP-S,

Raw File: G:\Org\FIS\DAT\FIS030905_b\0309F19.0017.RAW

Date & Time Acquired: 3/10/2005 6:04:28 AM

Method File: G:\Org\FIS\Methoden\LR17DC2.ME

Calibration File: G:\Org\FIS\Cal's\AL040831PC.CAL

Sample Weight: 30 Dilution: 4 S.A.: 1

COMPTON WOODWARD, JR.

Dilution: 4 S.A.: 1

Mean RF for C9 to C18 Aliphatic Hydrocarbons: 542.0073

Mean RF for C19 to C36 Aliphatic Hydrocarbons: 456.7756

Mean RF for Total Extractable Hydrocarbons: 493.3035

Rt range for Diesel Range Organics: 6.01 to 15.91

Rt range for C9 to C18 Aliphatic Hydrocarbons: 4.84 to 12.06

Rt range for C19 to C36 Aliphatic Hydrocarbons: 12.085 to 19.1

SURROGATE COMPOUND RT ACTUAL MEASURED REC
 *1-Chloro-octadecane 13.033 6.667 2.671 40.06

DRO Area : 222699.9 DRO Amount : 60.19279
TEH Area : 709461.9 TEH Amount : 191.758

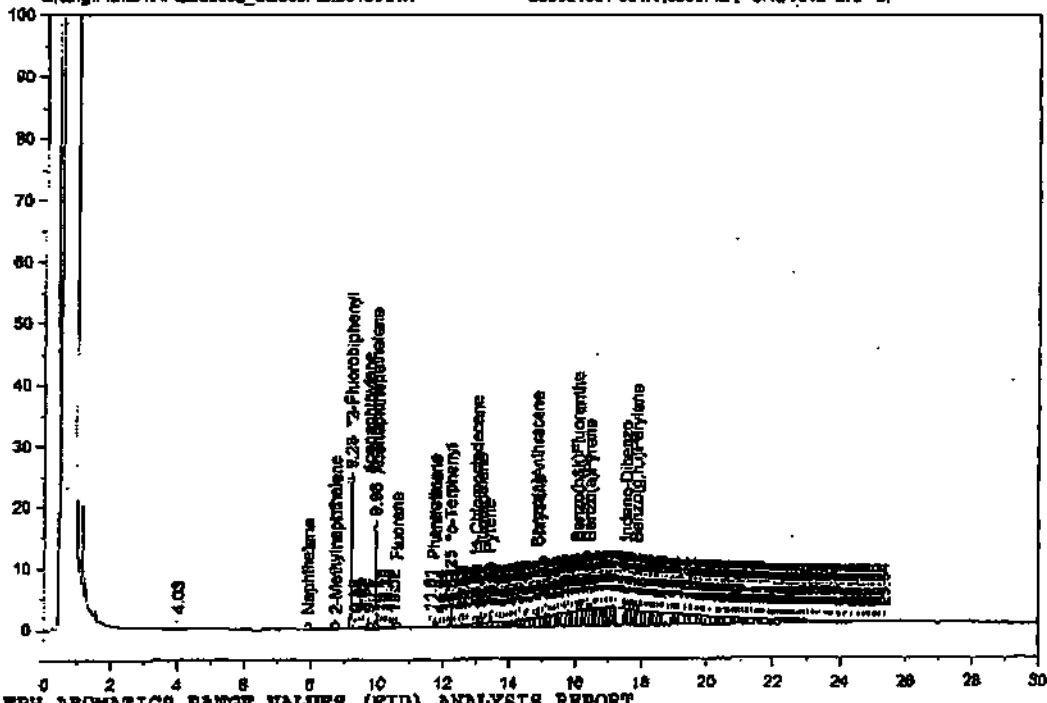
Aliphatic Hydrocarbon Areas and Amounts:
C9-C18 Area: 35655.35 C9-C18 Amount: 8.771186
C19-C36 Area: 486644.4 C19-C36 Amount: 142.0521

CS-20027

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Batch ID: 14773

B05021091-001A;0309FIS. \$HC-ARO-GRP-S.



EPH AROMATICS RANGE VALUES (PID) ANALYSIS REPORT

Sample Name: B05021091-001A;0309FIS, \$HC-ARO-GRP-S,

Raw File: G:\Org\PIS\DATA\FIS030905_b\0309FIS.0018.RAW

Date & Time Acquired: 3/10/2005 6:52:30 AM

Method File: G:\Org\PIS\Methods\RR20DC.MET

Calibration File: G:\Org\FIS\Cals\AR040831DC.CAL

Sample Weight: 30 Dilution: 4 S.A.: 1

Mean RP EPH Aromatics: 552.1979

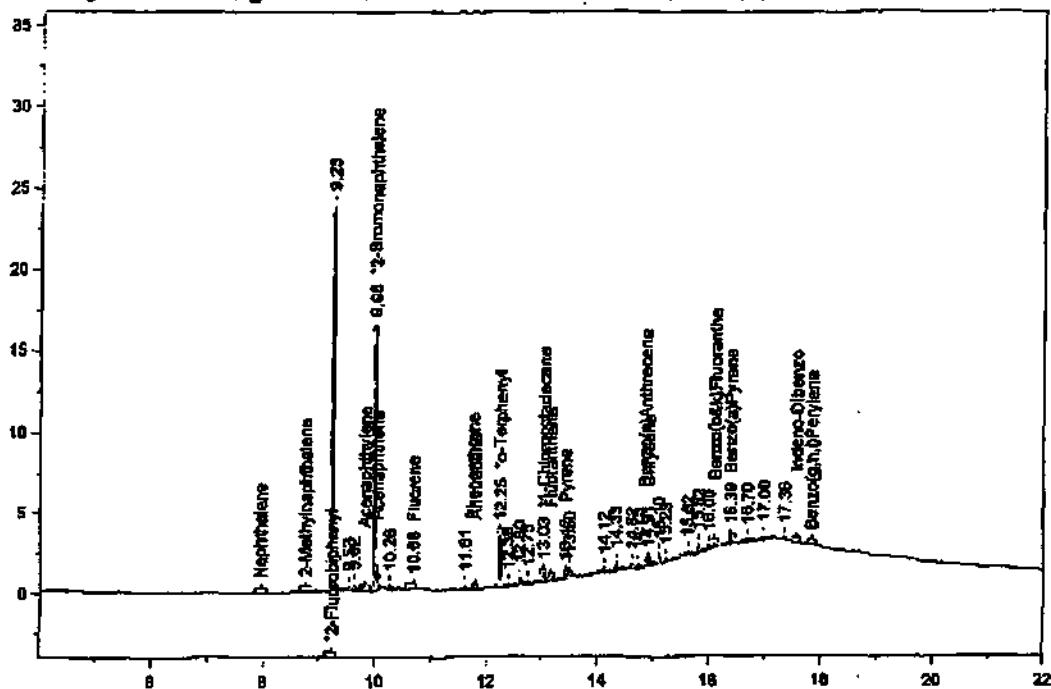
Rt range for EPH C11 to C22 Aromatics: 7.84 to 17.925

SURROGATE COMPOUND	RT	ACTUAL	MEASURED	VRBC
*2-Fluorobiphenyl	9.228	6.667	9.81	147.15
*3-Bromonaphthalene	9.983	6.667	10.418	156.27
*o-Terphenyl	12.248	6.667	1.698	25.47
*1-Chlorooctadecane	13.031	6.667	1.427	21.41

C11-C22 Aromatics Area: 579149.4
EPH Aromatics total Area: 1009176C11-C22 Aromatics Amount: 139.841
EPH Aromatics Total Amount: 243.6748

CG-20027

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Batch ID: 14773
B05021091-001A;0309FIS, SHC-ARO-GRP-S.

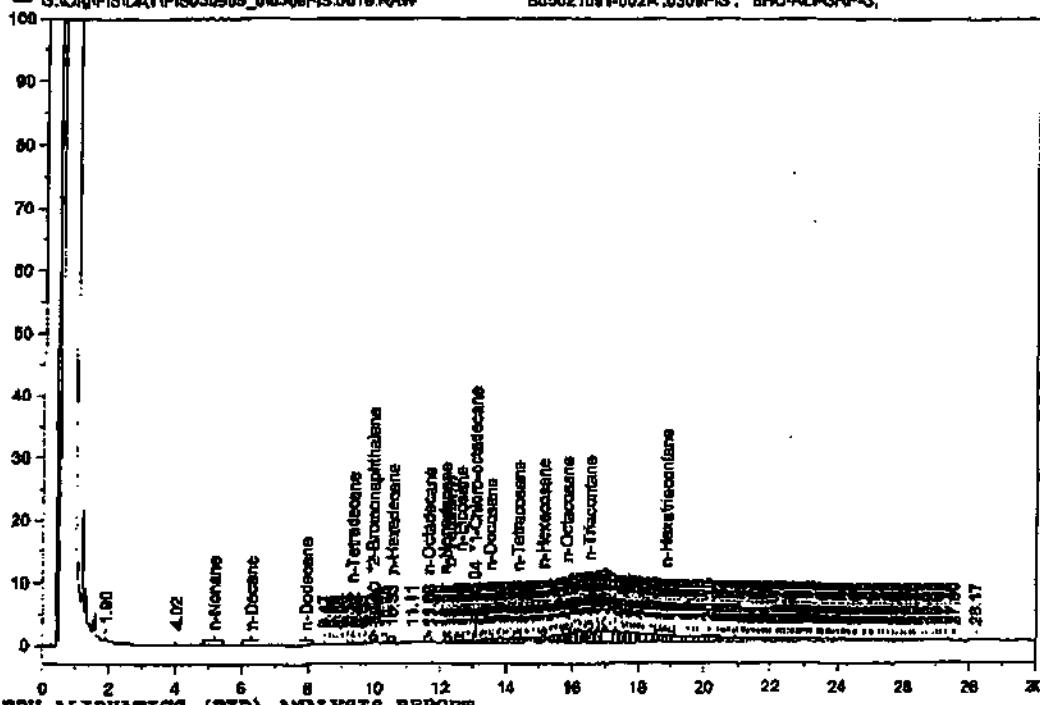
EPH AROMATICS TARGET VALUES (PID) ANALYSIS REPORT
Sample Name: B05021091-001A ;0309FIS, SHC-ARO-GRP-S,
Raw File: G:\Org\FIS\DAT\FIS030905_b\0309FIS.0018.RAW
Date & Time Acquired: 3/10/2005 6:52:30 AM
Method File: G:\Org\FIS\Methode\PTI9DC.MET
Calibration File: G:\Org\FIS\Cals\AR040831DC.CAL
Sample Weight: 30 Dilution: 4 S.A.: 1

TARGET ANALYTES	RT	CAL RT	RRT	AREA	AMOUNT	FLAG
Naphthalene	.	.	.	.	.267	U
2-Methylnaphthalene	.	.	.	.	.267	U
Acenaphthylene	.	.	.	.	.267	U
Acenaphthene	.	.	.	.	.267	U
Fluorene	10.684	10.684	10.684	544	.267	U
Phenanthrene	.	.	.	.	.267	U
Anthracene	.	.	.	.	.267	U
Fluoranthene	.	.	.	.	.267	U
Pyrene	13.421	13.421	13.421	603	.267	U
Benzo(a)Anthracene	.	.	.	.	.267	U
Chrysene	14.912	14.912	14.912	904	.267	U
Benzo(b,g)Fluoranthene	.	.	.	.	.533	U
Benzo(a)Pyrene	16.393	-6.46	-6.411	1048	.266	J
Indeno-Dibenzanthracene	.	.	.	.	.533	U
Benzo(g,h,i)Perylene	.	.	.	.	.267	U

SURROGATE COMPOUND	RT	ACTUAL	MEASURED	%REC	QC LIMITS
*2-Fluorobiphenyl	9.228	6.667	9.587	143.8	40-140
*2-Bromonaphthalene	9.983	6.667	10.048	150.72	40-140
*o-Terphenyl	12.248	6.667	1.406	21.09	40-140
*1-Chlorooctadecane	13.031	6.667	.503	7.54	40-140

CS-20036
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Batch ID: 14773



EPA ALIPHATICS (PID) ANALYSIS REPORT

Sample Name: B05021091-002A ;0309FIS , \$HC-ALL-GRP-S,

Raw File: G:\Org\PLIS\DAT\FI8030905_b\0309FIS.0019.RAW

Date & Time Acquired: 3/10/2005 7:40:50 AM

Method File: G:\Org\PLIS\Methods\LR17DC.MBT

Calibration File: G:\Org\PLIS\Calcs\AL040833DC.CAL

Sample Weight: 30 Dilution: 4 S.A.: 1

Mean RF for C9 to C18 Aliphatic Hydrocarbons: 542.0073

Mean RF for C19 to C36 Aliphatic Hydrocarbons: 456.7756

Mean RF for Total Extractable Hydrocarbons: 493.3035

Rt range for Diesel Range Organics: 6.01 to 15.91

Rt range for C9 to C18 Aliphatic Hydrocarbons: 4.84 to 12.06

Rt range for C19 to C36 Aliphatic Hydrocarbons: 12.085 to 19.1

SURROGATE COMPOUND	RT	ACTUAL	MEASURED	TREC
*1-Chloro-octadecane	13.036	6.667	3.034	45.51

DRO Area:172321.9 DRO Amount: 46.5763

TEN Area:681730.6 TRH Amount: 184.2626

Aliphatic Hydrocarbon Areas and Amounts:

C9-C18 Area:29823.93 C9-C18 Amount: 7.336662

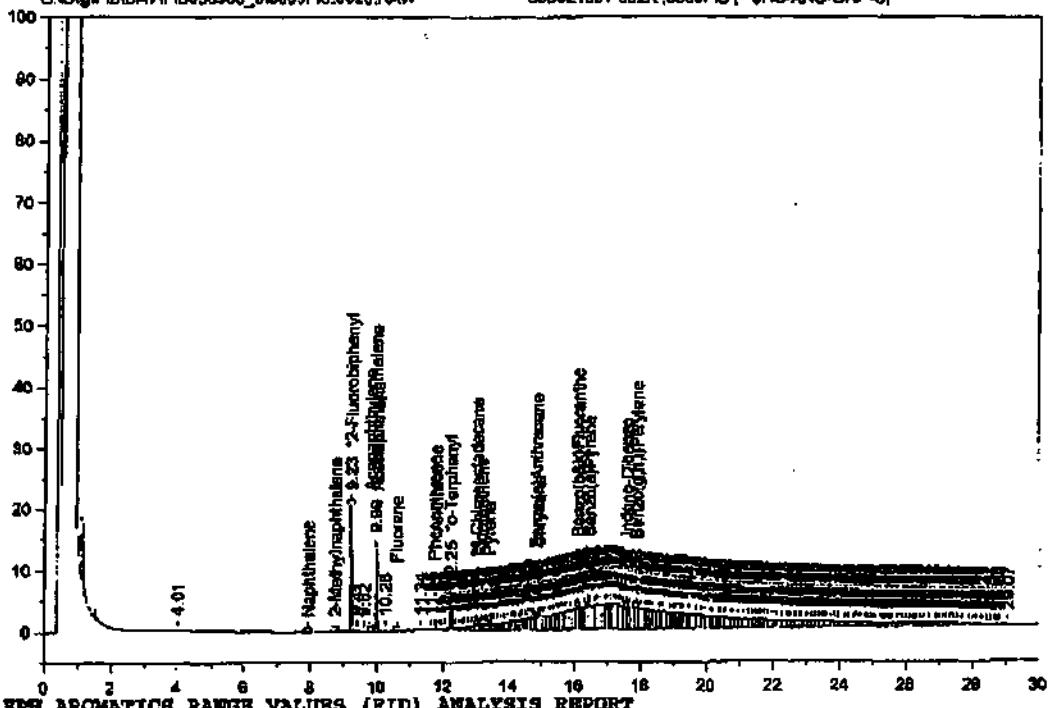
C19-C36 Area:448797.6 C19-C36 Amount: 131.0045

C5-20036

— G:\09g\F1S1\DATA\F1S030906_610209F1S.D020.RAW

Batch ID: 14773

605021091-002A 0308F16, SHC-ARO-GRP-S,



EPR AROMATICS RANGE VALUES (FID) ANALYSIS REPORT

Sample Name: B05021091-002A ;0309FIS , SMC-ARO-GRP-5.

Raw File: G:\Org\FIS\DAT\FIS030905_b\0309FIS.0020.RAW

Date & Time Acquired: 3/10/2005 8:29:35 AM

Method File: G:\Org\PIs\Methods\RR20DC.MET

Calibration File: G:\Org\FIS\Calcs\AR040831DC.CAL

Sample weight: 30 Dilution: 4 S.A.: 1

Mean RF EPH Aromatic: 552.1979

Rt range for BPN C11 to C22 Aromatics: 7.84 to 17.925

SURROGATE COMPOUND	RT	ACTUAL	MEASURED	%REC
*2-Fluorobiphenyl	9.23	6.667	8.559	128.38
*1-Bromonaphthalene	9.985	6.667	8.997	134.95
*o-Terphenyl	12.25	6.667	2.614	39.21
*1-Chlorooctadecane	13.036	6.667	1.566	24.98

C11-C22 Aromatics Area:753487.2

EPH Aromaticcs Total Area: 1473856

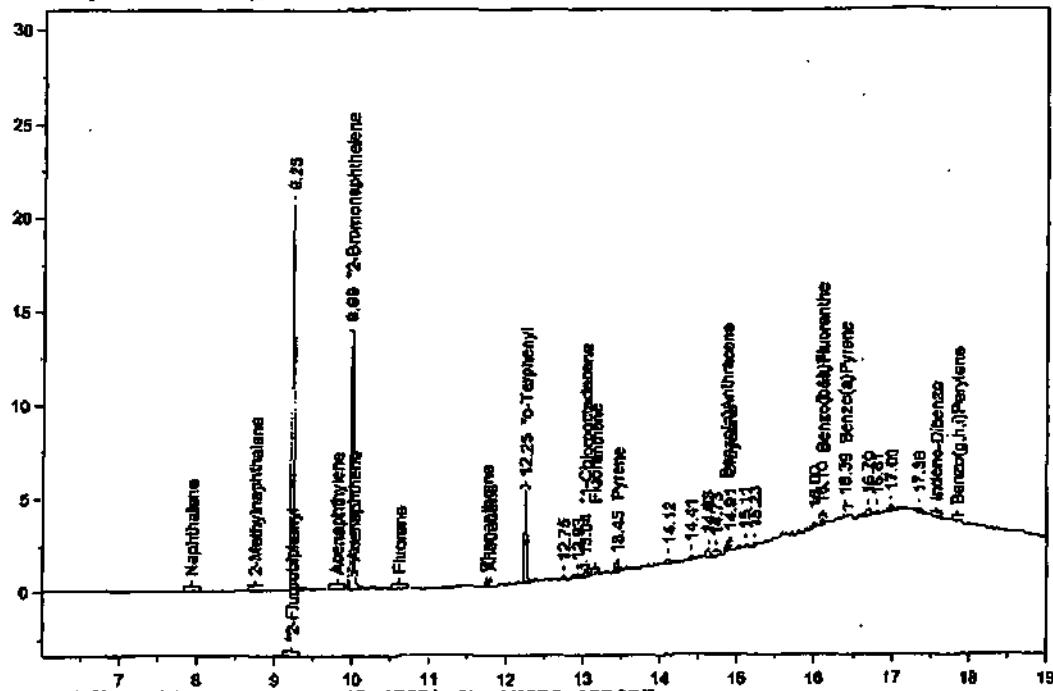
C11-C22 Aromatics Amount: 181.9365

EPH Aromatics Total Amount: 355.8763

CB-20036

— G:\D\gVFS\DATA\F190209015_b40309F19.0120.RAW

Batch ID: 14773
B05021091-002A;0009FIS. SHC-ARO-GRP-3.



EDP AROMATICS TARGET VALUES (FID) ANALYSIS REPORT

Sample Name: B05021091-002A ;0309PIS , SMC-ARO-GRP-5,

Raw File: G:\Org\PI9\DAT\PI8030905_b\0309PI9.0020.RAW

Date & Time Acquired: 3/10/2005 8:29:35 AM

Method File: G:\Org\FIS\Methode\RT20DC.MET

Calibration File: G:\Org\FIS\Calcs\AR040831DC.CAL

Sample Weight: 30

Dilution: 1

S.A.: 1

TARGET ANALYTES	RT	CAL RT	RRT	AREA	AMOUNT	FLAG
Naphthalene	.	.	.		.267	U
2-Methylnaphthalene	.	.	.		.267	U
Acenaphthylene	.	.	.		.267	U
Acenaphthene	.	.	.		.267	U
Fluorene	.	.	.		.267	U
Phenanthrene	.	.	.		.267	U
Anthracene	.	.	.		.267	U
Fluoranthene	.	.	.		.267	U
Pyrene	13.45	-3.46	-3.464	1062	.258	J
Benzo(a)Anthracene	.				.267	
Chrysene	14.912	14.912	14.912	543	.267	U
Benzo(bk)Fluoranthene	16.1	16.1	16.1	512	.533	U
Benzo(a)Pyrene	16.394	16.394	16.394	599	.267	U
Indeno-Bibenzo	.				.533	U
Benzo(g,h,i)Perylene	.	.	.		.267	U

SURROGATE COMPOUND	RT	ACTUAL	MEASURED	#REC	QC LIMITS
*2-Fluorobiphenyl	9.23	6.667	8.474	127.12	40-140
*3-Bromonaphthalene	9.985	6.667	8.802	132.03	40-140
*o-Terphenyl	12.25	6.667	2.083	31.24	40-140
*1-Chlorooctadecane	13.036	6.667	.321	4.82	40-140

Energy Laboratories Inc

Sample Receipt Checklist

Client Name Arrowhead Engineering

Date and Time Received: 2/22/2005

Work Order Number B06021091

Received by cfd

Checklist completed by: D. Diesel Signature

Date 2/22/05

Reviewed by

Initials

Date

Carrier name UPS Ground

Shipping container/cooler in good condition?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Custody seals intact on shipping container/cooler?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Custody seals intact on sample bottles?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Chain of custody present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody signed when relinquished and received?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody agrees with sample labels?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Samples in proper container/bottle?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sample containers intact?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sufficient sample volume for indicated test?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
All samples received within holding time?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	
Container/Temp Blank temperature in compliance?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	20 °C
Water - VOA vials have zero headspace?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	No VOA vials submitted <input checked="" type="checkbox"/>
Water - pH acceptable upon receipt?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Applicable <input checked="" type="checkbox"/>

Adjusted? _____ Checked by _____

Any No and/or NA (not applicable) response must be detailed in the comments section below.

Client contacted _____ Date contacted: _____ Person contacted _____

Contacted by: _____ Regarding: _____

Comments:

Samples received past recommended holding time for EPH analysis, analyze anyway per client.

Corrective Action _____

CHAIN OF CUSTODY RECORD/SAMPLE ANALYSIS REQUEST FORM

Page 1 of 1

Facility Number/Project Name: Johnston Acres Investigation - Soil Boring				 INTERNATIONAL PAPER						
Lab Contact:	Office:	Samplers:	Ben Sharp							
Ship to: Energy Lab		Company Name:	CDM	Analyses Requested						
1120 South 27th St. Billings, MT 59101										
Lab Contact Phone:										
Sample No.	Date	Time	Matrix	SPH	BZD	wp	PCP	Extra Container	Archive	Remarks
CS-20027	1/24	P.m	SL	L	L			O		Report to and Invoice to
CS-20036	1/24	P.m	SL	L	L			O		Arrived at Eng. Inc. P.O. Box 843 Lobby, MT 59923 ph. 406-293-9387
Matrix Code: GW - Groundwater ST - Soil SD - Sediment SW - Surface water	Priority: <input type="checkbox"/> Normal <input checked="" type="checkbox"/> Rush Rush time period <u>14 days</u>									
OTHER - Please identify codes _____										
Shipped via: <input checked="" type="checkbox"/> FedEx/UPS <input type="checkbox"/> Courier, Airbill	Condition of Samples Upon Receipt: _____									
Custody Seal Intact: <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> None										

Matrix Code: GW - Groundwater SL - Soil SD - Sediment SW - Surface water
OTHER - Please identify codes _____

Priority: Normal Rush Rush time period 14 days

Shipped via: FedEx/FedEx[®] UPS[®] Courier, Airbill

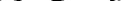
Condition of Samples
Upon Receipt: _____

Custody Seal Intact: Yes No None

Page 10 of 11 Page Number 10 of 11

Condition of Samples
Upon Receipt: _____

Custody Seal Intact: Yes No None

Renounced by:  Date: _____

2-16-05

Digitized by srujanika@gmail.com

Distinguished by: Cloudy Date: 10/10/07

Received by: _____

Date/Time: _____

Company: Arrowhead Engineering, Inc.

Company: _____

Digitized by srujanika@gmail.com

Relinquished by: _____ Date: _____

Name: _____ Received by: _____

Date/Time: २०२४-०८

Company: _____ (Signature)

Company: Energy

Digitized by srujanika@gmail.com

Distribution: White and Yellow Copies - Accompany Shipment; Pink Copy - Project File UPS G no seal on container
seal on bottle

Attachment 2

Alpha Analytical Laboratories – Data Package L0501766

Johnston Acres Sample Results

ALPHA ANALYTICAL LABORATORIES

Eight Walkup Drive
 Westborough, Massachusetts 01581-1019
 (508) 898-9220 www.alphalab.com

M2:M-MR025 NR:200301-A CT:PH-0574 ME:MA086 RI:68 NY:11148 NJ:MA935 Army:USACE

CERTIFICATE OF ANALYSIS

Client: Camp Dresser & McKee, Inc. Laboratory Job Number: LG501766

Address: 1 Cambridge Place
50 Hampshire Street
Cambridge, MA 02139 Date Received: 03-FEB-2005

Attn: Ms. Anni Autio Date Reported: 02-MAR-2005

Project Number: LIBBY2 Delivery Method: Fed Ex

Site: LIBBY SISTER SITE (DENVER, CO)

ALPHA SAMPLE NUMBER	CLIENT IDENTIFICATION	SAMPLE LOCATION
LG501766-01	CS-20027	DENVER, CO
LG501766-02	CS-20036	DENVER, CO

I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized by: Scott McLean
 This document electronically signed

**ALPHA ANALYTICAL LABORATORIES
NARRATIVE REPORT**

Laboratory Job Number: L0501765

Report Submission

This report replaces the report issued March 1, 2005. The report has been amended to include the results for all SemiVolatile Organics compounds.

At the authorization of the client, the samples were analyzed outside of the method required hold time.

Semi-Volatile Organics

L0501765-01 and -03 have elevated limits of detection due to the 5x dilutions required by the matrix interferences encountered during the extraction, concentration, and/or digestion of the samples.

The MS/MSD have a low % recovery for 2,4-Dinitrophenol and a high % recovery for 2,4-Dinitrotoluene.

四

LD50176-02 has elevated limits of detection due to the 5x dilutions required by the matrix interferences encountered during the extraction, concentration, and/or digestion of the sample.

The LCS/LCSD R2D's for C9-C10 Aliphatic range and Montana are above the acceptance criteria for the method.

TPH DEO

LC50D1288-01 and -02 have elevated limits of detection due to the 25x dilutions required by the elevated concentrations of target compounds in the samples.

Montana Ave + Balsam St.
Intersection

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

WA:K-MAG086 MR:200301-A CT:PM-0374 ME:MK086 RI:65 MW:11148 WJ:MA935 ADDY:CBMCB

Laboratory Sample Number: L0501766-01 Date Collected: 24-JAN-2005 00:00
 CS-2002? Date Received : 22-FEB-2005
 Sample Matrix: SOIL Date Reported : 02-MAR-2005
 Condition of Sample: Satisfactory Field Prep: None

Number & Type of Components: 1-Amber

PARAMETER	RESULT	UNITS	MDL	REF METHOD	DATE		ID
					PREP	ANAL	
Solids, Total	95.	%	0.10	16 28400			0203 12:15 AM
SVOC's by GC/MS 8270					1 8170C		0203 11:20 0301 14:30 NL
Aceanaphthalene	ND	ug/kg	1800				
Senecione	ND	ug/kg	18000				
1,2,4-Trichlorobenzene	ND	ug/kg	1800				
Hexachlorobenzene	ND	ug/kg	1800				
Bis(2-chloroethyl)ether	ND	ug/kg	1800				
1-Chloronaphthalene	ND	ug/kg	1800				
1-Chloronaphthalene	ND	ug/kg	2100				
1,2-Dichlorobenzene	ND	ug/kg	1800				
1,3-Dichlorobenzene	ND	ug/kg	1800				
1,4-Dichlorobenzene	ND	ug/kg	1800				
3,3'-Dichlorobenzidine	ND	ug/kg	18000				
2,4-Dinitrotoluene	ND	ug/kg	2100				
2,6-Dinitrotoluene	ND	ug/kg	1800				
Anisobenzene	ND	ug/kg	1800				
Fluoranthene	ND	ug/kg	1800				
4-Chlorophenyl phenyl ether	ND	ug/kg	1800				
4-Bromophenyl phenyl ether	ND	ug/kg	1800				
Bis(2-chloroisopropyl)ether	ND	ug/kg	1800				
Bis(2-chloroethoxy)methane	ND	ug/kg	1800				
Hexachlorobutadiene	ND	ug/kg	3500				
Hexachlorocyclopentadiene	ND	ug/kg	3500				
Hexachloroethane	ND	ug/kg	1800				
Isophorone	ND	ug/kg	1800				
Naphthalene	ND	ug/kg	1800				
Nitrobenzene	ND	ug/kg	1800				
NDPA/CPR	ND	ug/kg	9300				
n-Nitrosodi-n-propylamine	ND	ug/kg	1800				
Bis(2-ethylhexyl)phthalate	ND	ug/kg	3500				
Butyl benzyl phthalate	ND	ug/kg	1800				
Di-n-butylphthalate	ND	ug/kg	1800				
Di-n-tetethylphthalate	ND	ug/kg	1800				
Diethyl phthalate	ND	ug/kg	1800				
Dimethyl phthalate	ND	ug/kg	1800				
Benz(a)anthracene	ND	ug/kg	1800				
Benz(a)pyrene	ND	ug/kg	1800				
Benz(b)fluoranthene	ND	ug/kg	1800				

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

Laboratory Sample Number: L0501766-01
CS-20027

PARAMETER	RESULT	UNITS	IDL	REF METHOD	DATE	ID
					PREP	ANAL
SVOC's by GC/MS #270 continued						
Benzo(k) fluoranthene	ND	ug/kg	1800		1-0378C	03/03/2005 14:38:10
Chrysene	ND	ug/kg	1800			
Acenaphthylene	ND	ug/kg	1800			
Acenaphthene	ND	ug/kg	1800			
Genzo(g,h)perylene	ND	ug/kg	1800			
Fluorene	ND	ug/kg	1800			
Phenanthrene	ND	ug/kg	1800			
Dibenz(a,h)anthracene	ND	ug/kg	1800			
Indeno(1,2,3-cd)pyrene	ND	ug/kg	1800			
Pyrene	ND	ug/kg	1800			
Benzo(e)pyrene	ND	ug/kg	1800			
Biphenyl	ND	ug/kg	1800			
Perylene	ND	ug/kg	1800			
Aniline	ND	ug/kg	3500			
4-Chloroaniline	ND	ug/kg	1800			
1-Methylnaphthalene	ND	ug/kg	1800			
2-Nitroaniline	ND	ug/kg	1800			
3-Nitroaniline	ND	ug/kg	1800			
4-Nitroaniline	ND	ug/kg	2400			
Dibenzofuran	ND	ug/kg	1800			
a,a-Dimethylphenethylamine	ND	ug/kg	18000			
Hexachloropropene	ND	ug/kg	3500			
Nitrosodi-n-butylamine	ND	ug/kg	2500			
2-Methylnaphthalene	ND	ug/kg	2800			
1,2,4,5-Tetrachlorobenzene	ND	ug/kg	7000			
Pentachlorobenzene	ND	ug/kg	7000			
a-Naphthylamine	ND	ug/kg	7000			
b-Naphthylamine	ND	ug/kg	7000			
Phenacetin	ND	ug/kg	3500			
Dimethoate	ND	ug/kg	7000			
4-Aminobiphenyl	ND	ug/kg	1500			
Pentachloronitrobenzene	ND	ug/kg	3500			
Isodrin	ND	ug/kg	3500			
p-Dimethylaminogrobenzene	ND	ug/kg	3500			
Chlorobensilate	ND	ug/kg	7000			
3-Methylcholanthrene	ND	ug/kg	1000			
Ethyl Methanesulfonate	ND	ug/kg	5300			
Acetophenone	ND	ug/kg	7000			
Nitrosodipiperidine	ND	ug/kg	7000			
7,12-Dimethylbenz(a)anthracene	ND	ug/kg	3500			
n-Nitrodimethylamine	ND	ug/kg	18000			
2,4,6-Trichlorophenol	ND	ug/kg	1800			
p-Chloro-m-cresol	ND	ug/kg	1800			
2-Chlorophenol	ND	ug/kg	2100			
2,4-Dichlorophenol	ND	ug/kg	3600			
2,4-Dimethylphenol	ND	ug/kg	3500			
2-Nitrophenol	ND	ug/kg	7000			
4-Nitrophenol	ND	ug/kg	5500			
2,4-Dinitrophenol	ND	ug/kg	7000			

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

Laboratory Sample Number: L0601786-01
CS-2002?

PARAMETER	RESULT	UNITS	IDL	REF METHOD	DATE	ID
					PPBP	ANAL
SVOC's by GC/MS 8270 continued				1 8270C	02/28 17:30	0101 14:30 HS
4,4-Dinitro-o-cresol	ND	ug/kg	7000			
Pentachlorophenol	ND	ug/kg	7000			
Phenol	ND	ug/kg	2400			
2-Methylphenol	ND	ug/kg	2100			
3-Methylphenol/4-Methylphenol	ND	ug/kg	2100			
2,4,5-Trichlorophenol	ND	ug/kg	1800			
2,4-Dichlorophenol	ND	ug/kg	3500			
Benzal Acid	ND	ug/kg	18000			
Benzyl Alcohol	ND	ug/kg	3900			
Carbazole	ND	ug/kg	1600			
Surrogate(s)	Recovery			QC Criteria		
2-Fluorophenol	107.	%	25-120			
Phenol-d6	118.	%	10-120			
Nitrobenzene-d5	105.	%	29-120			
2-Fluorobiphenyl	151.	%	30-120			
2,4,6-Tribromophenol	106.	%	19-120			
4-Naphthyl-d14	103.	%	18-120			
Petroleum Hydrocarbons by GC-EI				1 8015A(m)	02/23 15:00	0126 14:36 HS
Diesel Range Organics	860000	ug/kg	660000			
Surrogate(s)	Recovery			QC Criteria		
o-Terphthalyl	106.	%	45-140			

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

Laboratory Sample Number: L0501766-01
CS-20027

PARAMETER	RESULT	UNITS	BDL	REF METHOD	DATE		ID
					BEST	ANAL.	
Extractable Petroleum Hydrocarbons				GL 870-04-1	02/28/05 09:45	03/01/05:00:00 AM	

Quality Control Information

Condition of sample received: Satisfactory
 Sample temperature upon receipt: Received on Ice
 Sample extraction method: Extracted Per the Method
 Were all QA/QC procedures REQUIRED by the method followed? YES
 Were all performance/acceptance standards for the required procedures achieved? YES
 Were significant modifications made to the method as specified in Sect 11.3?
 The normal acceptance range for the extraction surrogates, Chloro-octadecane
 and o-Terphenyl, is 40-140%.
 The normal acceptance range for the fractionation surrogates, 2-Fluorobiphenyl
 and 2-Bromonaphthalene, is 40-140%.

C9-C18 Aliphatics	94.5	mg/kg	35.1
C19-C36 Aliphatics	512.	mg/kg	35.1
C11-C22 Aromaticas, Unadjusted	848.	mg/kg	35.1
C11-C25 Aromaticas, Adjusted	848.	ug/kg	35.1

surrogate(s)	Recovery	QC Criteria
Chloro-Octadecane	60.0	40-140
o-Terphenyl	110.	40-140
2-Fluorobiphenyl	81.0	40-140
2-Bromonaphthalene	88.0	40-140

Comments: Complete list of References and Glossary of Terms found in Addendum I

Montana Ave + Larch St.
Intersection

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

MU:14-MA086 MH:200301-A CT:PK-0574 ME:MA086 RL:65 NY:11148 NJ:MA935 Army:USACE

Laboratory Sample Number: MU501766-02 Date Collected: 24-JAN-2005 00:00
GL-20036 Date Received: 22-FEB-2005
Sample Matrix: SOIL Date Reported: 02-MAR-2005
Condition of Sample: Satisfactory Field Prep: None

Number & Type of Containers: 1-Amber

PARAMETER	RESULT	UNITS	MDL	TEST METHOD	DATE PREP	ID ANAL
Solids, Total	91.	%	0.10	# 22400	02/03 13:10 ET	
SVOC's by GC/MS 8270				1. 82700	02/03 13:10 ET	0161 14:00 ET
Aceanaphthalene	ND	ug/kg	1800			
Benzidine	ND	ug/kg	18000			
1,2,4-Trichlorobenzene	ND	ug/kg	1800			
Hexachlorobenzene	ND	ug/kg	1800			
Bis(2-chloroethyl) ether	ND	ug/kg	1800			
1-Chloronaphthalene	ND	ug/kg	1800			
2-Chloronaphthalene	ND	ug/kg	2200			
1,2-Dichlorobenzene	ND	ug/kg	1800			
1,3-Dichlorobenzene	ND	ug/kg	1800			
1,4-Dichlorobenzene	ND	ug/kg	1800			
3,3'-Bischlorobenzoide	ND	ug/kg	18000			
2,4-Dinitrotoluene	ND	ug/kg	2200			
2,5-Dinitrotoluene	ND	ug/kg	1800			
Azobenzene	ND	ug/kg	1800			
Fluoranthene	ND	ug/kg	1800			
4-Chlorophenyl phenyl ether	ND	ug/kg	1800			
4-Bromophenyl phenyl ether	ND	ug/kg	1800			
Bis(2-chloroisopropyl)ether	ND	ug/kg	1800			
Bis(2-chloroethyl)methane	ND	ug/kg	1800			
Hexachlorobutadiene	ND	ug/kg	3700			
Hexachlorocyclopentadiene	ND	ug/kg	3700			
Hexachloroethane	ND	ug/kg	1800			
Isophorone	ND	ug/kg	1800			
Naphthalene	ND	ug/kg	1800			
Nitrobenzene	ND	ug/kg	1800			
NDPA/EPA	ND	ug/kg	5500			
n-Nitrosodi-n-propylamine	ND	ug/kg	1800			
Bis(2-ethylhexyl)phthalate	ND	ug/kg	3700			
Butyl benzyl phthalate	ND	ug/kg	1800			
Di-n-tetylphthalate	ND	ug/kg	1800			
Di-n-octylphthalate	ND	ug/kg	1800			
Diethyl phthalate	ND	ug/kg	1800			
Dimethyl phthalate	ND	ug/kg	1800			
Benzo(a)anthracene	ND	ug/kg	1800			
Benzo(a)pyrene	ND	ug/kg	1800			
Benzo(b)fluoranthene	ND	ug/kg	1800			

Comments: Complete list of References and Glossary of Terms found in addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

Laboratory Sample Number: L0901766-02
CS-20036

PARAMETER	RESULT	UNITS	IDL	REF METHOD	DATE	ID
					PREP	ANAL.
SVOC's by GC/MS 8270 continued				1 8270	03/03/2005 14:04:46	
Benzo(k)fluoranthene	ND	ug/kg	1800			
Chrysene	ND	ug/kg	1800			
Acenaphthylene	ND	ug/kg	1800			
Anthracene	ND	ug/kg	1800			
Benzo(g,h)perylene	ND	ug/kg	1800			
Fluorene	ND	ug/kg	1800			
Phenanthrene	ND	ug/kg	1800			
Dibenzo(a,h)anthracene	ND	ug/kg	1800			
Indeno(1,2,3-cd)pyrene	ND	ug/kg	1800			
Pyrene	ND	ug/kg	1800			
Benzo(e)pyrene	ND	ug/kg	1800			
Biphenyl	ND	ug/kg	1800			
Perylene	ND	ug/kg	1800			
Aniline	ND	ug/kg	3700			
4-Chloroaniline	ND	ug/kg	1800			
1-Methylnaphthalene	ND	ug/kg	1800			
2-Nitroaniline	ND	ug/kg	1800			
3-Nitroaniline	ND	ug/kg	1800			
4-Nitroaniline	ND	ug/kg	2600			
Dibenzofuran	ND	ug/kg	1800			
A,a'-Dimethylphenethylamine	ND	ug/kg	18000			
Hexachloropropene	ND	ug/kg	3700			
Nitroso-di-n-butylamine	ND	ug/kg	3700			
2-Methylnaphthalene	ND	ug/kg	2900			
1,2,4,5-Tetrachlorobenzene	ND	ug/kg	7300			
Pentachlorobenzene	ND	ug/kg	7300			
a-Naphthylamine	ND	ug/kg	7300			
b-Naphthylamine	ND	ug/kg	7300			
Phenacetin	ND	ug/kg	3700			
Dimethcetate	ND	ug/kg	7300			
4-Aminobiphenyl	ND	ug/kg	3700			
Pentachloronitrobenzene	ND	ug/kg	3700			
Iodrin	ND	ug/kg	3700			
p-Dimethylaminoazobensene	ND	ug/kg	3700			
Chlorobenzilate	ND	ug/kg	7300			
3-Methylcholanthrene	ND	ug/kg	7300			
3-Ethyl Methanesulfonate	ND	ug/kg	5500			
Acetophenone	ND	ug/kg	7300			
Nitronodipiperidine	ND	ug/kg	7300			
7,12-Dimethylbenz(a)anthracene	ND	ug/kg	3700			
n-Nitrosodimethylamine	ND	ug/kg	18000			
2,4,6-Trichlorophenol	ND	ug/kg	1800			
p-Chloro-m-cresol	ND	ug/kg	1800			
2-Chlorophenol	ND	ug/kg	2200			
2,4-Dichlorophenol	ND	ug/kg	3700			
2,4-Dimethylphenol	ND	ug/kg	3700			
2-Nitrophenoil	ND	ug/kg	7300			
4-Nitrophenoil	ND	ug/kg	3700			
2,4-Dinitrophenoil	ND	ug/kg	7300			

Comments: Complete list of References and Glossary of Terms found in Addendum I.

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

Laboratory Sample Number: L0501766-03
CS-16036

PARAMETER	RESULT	UNITS	EDL	REF METHOD	DATE	ID
					PREP	ANAL
SVOC's by GC/MS 8270 continued						
4,6-Dinitro-p-xenyl	ND	ug/kg	7300			
Pentachlorophenol	ND	ug/kg	7300			
Phenol	ND	ug/kg	2600			
2-Methylbenzol	ND	ug/kg	2200			
3-Methylphenol/4-Methylphenol	ND	ug/kg	2200			
3,4,5-Trichlorophenol	ND	ug/kg	1800			
2,6-Dichlorophenol	ND	ug/kg	3700			
Benzoic Acid	ND	ug/kg	18000			
Benzyl Alcohol	ND	ug/kg	3700			
Carbazole	ND	ug/kg	1800			
Surrogate(s)	Recovery			QC Criteria		
2-Fluorophenol	103.	%	25-120			
Phenol-d5	111.	%	10-120			
Nitrobenzene-d5	104.	%	25-120			
2-Fluorobiphenyl	100.	%	30-120			
2,4,6-Tribromophenol	110.	%	19-120			
4-Terphenyl-d14	103.	%	18-120			
Petroleum Hydrocarbons by GC-DRO						
Diesel Range Organics	710000	ug/kg	690000			
Surrogate(s)	Recovery			QC Criteria		
o-Terpheyne	97.0	%	40-140			

Comments: Complete list of References and Glossary of Terms found in Addendum 1

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

Laboratory Sample Number: L0501766-02
CS-20036

PARAMETER	RESULT	UNITS	REV.	REF METHOD	DATE	ID
Pretreatable Petroleum Hydrocarbons	43	PPM-04-1	0523 15:09 0225 22:54 LT	PREP ANAL		

Extractable Petroleum Hydrocarbons 41 EPH-04-2 0223 15:09 0225 22:54 LT

Quality Control Information

Condition of sample received: Satisfactory
 Sample temperature upon receipt: Received on Ice
 Sample extraction method: Extracted Per the Method
 Were all QA/QC procedures REQUIRED by the method followed? YES
 Were all performance/acceptance standards for the required procedures achieved? YES
 Were significant modifications made to the method as specified in Sect 11.3? NO
 The normal acceptance range for the extraction surrogates, Chloro-octadecane and o-Terphenyl, is 40-140%.
 The normal acceptance range for the fractionation surrogates, 1-Fluorobiphenyl and 2-Bromonaphthalene, is 40-140%.

C9-C18 Aliphatics	94.5	mg/kg	27.5
C19-C34 Aliphatics	55.3	mg/kg	27.5
C11-C23 Aromatics, Unadjusted	583.	mg/kg	27.5
C11-C23 Aromatics, Adjusted	583.	mg/kg	27.8

Surrogate(s)	Recovery		CC Criteria
Chloro-Octadecane	85.0	+	40-140
<i>n</i> -Terphenyl	93.0	+	40-140
2-Fluorobiphenyl	69.0	+	40-140
2-Bromonaphthalene	73.0	+	40-140

Comments: Complete list of References and Glossary of Terms found in Addendum I